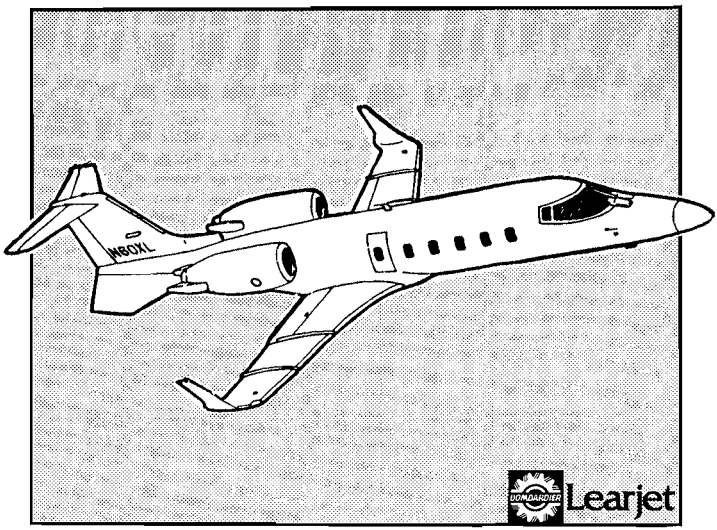
FAA APPROVED

AIRPLANE FLIGHT MANUAL

Learjet 60



This airplane must be operated in compliance with the prescribed limitations in Section I of this manual.

Serial Number _____

N _____

FAA
APPROVED J M Baker DATE 15 Jan 1993

for
MANAGER
AIRCRAFT CERTIFICATION OFFICE
FEDERAL AVIATION ADMINISTRATION
WICHITA, KANSAS

FM-123

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SECTION II — NORMAL PROCEDURES

General Changes	Changed topic headings from all caps to upper/lower case. Changed bullets from “Dots” to “Dashes”. Changed referenced procedures from all caps to bolded upper/lower case. Added step identifiers to alternate steps and sub-steps.
Exterior Preflight	Step i - added nose wheel tire pressure check. Step k - added Rt main tire pressure check. Step d - added Lt main tire pressure check.
Before Starting Engines	Rearranged steps to align with the 60XR. Step 7 - moved step for uncage standby attitude indicator, to step 28. Steps 15-17 changed the order of the steps to align with the 60XR. Moved step 18 - fuel quantity check to the “Fuel System” check step. Step 22 - added and reformatted notes to a step for electrical power. Step 23 - moved step 27 to step 23, avionics L & R master switches - on. Step 24 - added “or SB 60-31-2” to “and prior aircraft modified by SB 60-31-1”. Changed “yellow” to “amber”. Added words “and then become steady”. Added to step 3 “ and hold”. Step 26 - replaced Minimum trim systems preflight check, with the “Trim Systems Operational check” procedure. Step 29 - added “CABIN PWR switch, (if installed) - On.”
Starting Engines	Procedure reformatted to the new manual conventions. Steps renumbered and reformatted. Step 6 - added notes for aircraft with lead-acid batteries and aircraft with nickel cadmium batteries. Step 14 - reformatted step to the new manual conventions. Step 14 n - added “go to step 15.” Step 19 - added “Fuel control panel and quantity - checked”.
Before Taxi	Rearranged steps to align with the 60XR. Step 1c - added takeoff data step. Step 1d - added “and Nav Equipment”. Step 7 - added flight controls check. Step 10 - added step for aircraft lighting - on, as required. Step 13 - changed “Parking Brake” to all upper case.

Taxi and Before Takeoff	Rearranged steps to align with the 60XR. Moved the Spoiler — Arm step from the Runway Lineup checklist to this checklist. Step 5 - added effectivity for aircraft incorporating SB60-27-6. Step 9 - reformatted to the new manual conventions.
Runway Lineup	Step 3 - changed “PITOT HT light out” to “All PITOT HEAT lights extinguished.” Moved the Spoiler — Arm, step to the Taxi and Before Takeoff checklist.
After Takeoff	Step 5 - deleted “if autospoilers were armed for takeoff”. Step 6 - deleted “if APR was armed for takeoff”.
Climb	Changed step 4 to read - “RECOG/PULSE, OFF.”
Descent	Added Step 1 - “WSHLD DEFOG Switch — As desired” Changed step 4 to read - “RECOG/PULSE, as desired.”
Approach	Step 5 - reformatted to the new manual conventions. Step 6 - moved “ENG SYNC Switch - OFF” to the Before Landing checklist.
Before Landing	Step 1 - deleted “RET or”. Step 2 - added the “ENG SYNC Switch - OFF” step from the Approach checklist.
Landing	Step 3 - changed “(if desired)” to “Deploy, as desired.” Step 3 - rearranged steps into notes, cautions and warnings to align with the 60XR.
After Landing/Clearing Runway	Changed “Lights - as desired” to “Aircraft Lighting - ON, as desired”.
Shutdown	Rearranged steps to align with the 60XR.
Quick Turn-Around	Rearranged steps to align with the 60XR. Reformatted some steps to the new manual conventions. Moved the Spoilers — Arm step to the Taxi checklist and added effectivity note.
Anti-Ice Systems	Reformatted steps to the new manual conventions.
Anti-Ice Systems Wing Anti-Ice	Changed reference to procedure for “Anti-Ice System Failure” to “WING HT Light Illuminated Procedure”.
Anti-Ice Systems Windshield Defog	Reformatted step 1 to the new manual conventions.
Annunciations	Changed title from “Annunciator Panel” to “Annunciations”. Changed “Pressing” to “Depressing”

Autopilot/Flight Guidance System	Changed title from “Autopilot/Flight Director System” to Autopilot/Flight Guidance System”. Rearranged information to align with the 60XR. Changed title from “To Engage Autopilot” to “Autopilot Engagement”. Changed title from “To Disengage Autopilot” to “Autopilot Disengagement”. Changed title from “To Engage Yaw Damper” to “Yaw Damper Engagement”. Changed title from “To Disengage Yaw Damper” to “Yaw Damper Disengagement”.
Rudder Boost System	Changed subtitle from “To Engage Rudder Boost System” to “Arm Rudder Boost System”. Changed subtitle from “To Disengage Rudder Boost System” to “Disarm Rudder Boost System”.
Avionics System (General Changes)	Added the Heading “Avionics System” to several pages. Reformatted to the new manual conventions. Changed “press” to “depress”. Changed “pressing” to “depressing”.
Flight Management System	Incorporated TFM 2009-01 — Dual UNS-1E Software 802.x.
Engine Systems	Added Heading “Engine Systems”.
Automatic Performance Reserve (APR)	Deleted “and associated wiring”. Added the word “green” to describe the APR ARM light. Added the word “amber” to describe the APR ON light. Changed “Therefore, the APR switch must be set to OFF to return” to “ APR switch is set to OFF returning the thrust schedule to normal”.
Environmental Systems	Added Heading “Environmental Systems”.
Bleed Air Heating and Cooling. Additional Cooling	Added to note - “or an APU (if installed)”. Added to step 1 under Ground Operation - “or an APU (if installed)”.
Bleed Air Heating and Cooling. Additional Heating	Added to note - “or an APU (if installed)”. Added to step 1 under Ground Operation - “or an APU (if installed)”.
Bleed Air Heating and Cooling. Additional Air Circulation	Added to note - “or an APU (if installed)”.
Oxygen System Crew Oxygen (EROS Crew Masks) Preflight	Deleted “To check for oxygen availability to the mask while stowed,” from step 1

Oxygen System Crew Oxygen (Puritan Bennet Crew Masks) Preflight	Deleted “To check for oxygen availability to the mask while stowed,” from step 1.
Pressurization System	Added “or SB 60-31-2” to “and prior aircraft modified by SB 60-31-1”.
Landing Gear and Brakes	Added “Landing Gear” to heading.
Spoiler System	Deleted “Spoileron” from the heading.
Spoiler System Spoilerons (Aileron Augmentation)	Deleted “or the SPOILERON circuit breaker (R TRIM-FLT CONT group) pulled. Refer to Section I for Spoilers/Auto-spoilers/Spoileron System limitations”.
Stall Warning System	Added system description.
Thrust Reverser System	Changed Circuit Breakers step to “Set”.
Trim System Operational Check	Deleted periodic operational check procedure — this is part of the Before Starting Engines procedure.

SECTION III — EMEREGENCY PROCEDURES

General Changes	Changed presentation of memory box contents: Bold — needs to be memorized; Normal — information only. Changed topic headings from all caps to upper/lower case. Changed bullets from “Dots” to “Dashes” Added step identifiers to alternate steps and sub-steps. Changed Referenced procedures from all caps to bolded upper/lower case.
INTRODUCTION	Added to Memory box explanation, “Data that is enclosed in a box but **not** boldfaced need not be memorized”.
Dual Generator Failure	Added Thrust Reversers to the condition tables. Changed Circuit breakers step to Set and added Location of the circuit breaker. Changed “BAT 1 and 2” to “BATTERY”. Changed “ship’s” to “main”. Updated procedure steps 17 thru 22 adding alternate steps and sub-steps with the 60XR style. Arranged conditions lists with the 60XR style.
Engine Failure	Removed Note from memory box for “Above V1 Speed”. Added Note after “Yaw Damper — As desired”.
Engine Fire — Shutdown	Changed “*On aircraft 60-001 thru 60-015,* the EMER PRESS light will illuminate” to “*On aircraft 60-001 thru 60-015,* the EMER PRESS light may illuminate“. Converted part of the “Electrical Load — Monitor” step to a note. Added “This checklist is complete”.

Oil Press Light Illuminated or Oil Temperature is high	Added “This checklist is complete”.
Immediate Engine Airstart	Updated procedure with the 60XR style.
Cabin Altitude Warning Horn Activates, Cabin Altitude Exceeds 10,000 Feet, or CABIN ALT HI Light Illuminates (If Applicable) (Emergency Descent)	Added “or SB 60-31-2” to “and prior aircraft modified by SB 60-31-1”.
ENTRY DOOR or AFT CAB DOOR Light Illuminated	Updated condition statements with the 60XR style.
BLEED AIR Light Illuminated	Relocated and updated procedure with the 60XR style.
Cabin Fire Light Illuminated or Cabin/Cockpit Fire, Smoke, or Fumes	Updated procedure to provide quicker assessment of the problem and easier location of the applicable procedure.
Control System Jam	Added “If the controls are not jammed, but there is a control axis malfunction present”.
Overspeed Recovery — Overspeed Horn Sounds	Updated procedure with the 60XR style.
Pitch Axis Malfunction	Removed notes from memory box. Updated procedure with the 60XR style. Added “This checklist is complete”.
Roll or Yaw Axis Malfunction	Removed “or” from “ROLL TRIM and YAW TRIM Circuit Breakers”. Added “This checklist is complete”.
FUEL PRESS Light Illuminated in Flight	Added “This checklist is complete”. Updated procedure with the 60XR style.
Ditching	Added to step 1 “perform the following; otherwise go to step 2:”. Added “Crew” to Life vests — On. Moved Note about inflating life vests. Added Note about CABIN PWR switch off. Added step 10 Seat Belts — On until aircraft comes to a complete stop. Added “Go to step 2”.
Emergency Evacuation	Updated procedure with the 60XR style and removed “both” from BATTERY.

Forced Landing — Both Engines Inoperative	Added to step 1 “perform the following; otherwise go to step 2:”. Removed Step “NO SMOKING/FASTEN SEAT BELTS Switch — On”. Added “TCAS (if installed) — Select TA Only”. Added “Go to step 2”. Added “TERR Switch (if installed) — Select INHIBIT”. Removed Note. Moved step “EMER BAT Switches — OFF.” Added “After airplane comes to a complete stop”.
Aborted Takeoff	Incorporated TFM 2009-03 — Tire Limitation and Thrust Reverser Inadvertent Stow. Added “This checklist is complete”.
Inadvertent Stow of Thrust Reverser After a Crew-Commanded Deployment	Incorporated TFM 2009-03 — Tire Limitation and Thrust Reverser Inadvertent Stow.
Inadvertent Thrust Reverser Deployment During Takeoff	Replaced Below V1 Speed memory box reference with actual steps. Moved Above V1 Speed memory box notes to below box. Added “This checklist is complete”.
TR UNLOCK/TR DEPLOY and ENG CMPTR Lights Illuminated In Flight	Added “This checklist is complete”.

SECTION IV — ABNORMAL PROCEDURES

General Changes	Changed topic headings from all caps to upper/lower case. Changed bullets from “Dots” to “Dashes” Added step identifiers to alternate steps and sub-steps. Changed Referenced procedures from all caps to bolded upper/lower case.
Introduction	Removed information about procedures in memory boxes.
Inadvertent Icing Encounter	Updated procedure with the 60XR style.
NAC HT Light Illuminated	Added step identifier to alternate steps and to sub-steps.
PITOT HT Light Illuminated	Changed Circuit breakers step to Set. Added step identifier to step 4.
STAB HT Light Illuminated in Flight	Relocated steps and added “This checklist is complete”.
WING HT Light Illuminated	Changed Circuit breaker step to Set. Added “Go to step 3”. Removed step “STAB WING HEAT Switch — off”. Added step identifier to step 3.

Windshield Heat Failure	Changed Circuit breaker step to Set. Updated procedure with the 60XR style.
WS DEFOG Light Illuminated	Updated procedure with the 60XR style.
AC Bus Failure	Updated procedure with the 60XR style.
Cur Lim Light Illuminated	Added “Go to step 3” and relocated Note. Changed “RECOG Light Switch” to “RECOG/PULSE Switch”
DC Bus failure	Updated procedure with the 60XR style. Added “This checklist is complete”.
ELEC PWR Light Illuminated	Added Note about single generator operation. Added “This checklist is complete”. Updated procedure with the 60XR style.
Single Generator Failure	Updated procedure with the 60XR style.
Airstart	Updated procedure with the 60XR style.
Amber and White ENG CMPTR Light Illuminated	Updated procedure with the 60XR style.
Engine Shutdown in Flight	Updated step 7 and added note.
Starter Engaged Light Remains Illuminated after Start	Updated Ground Start procedure with the 60XR style.
DUCT OV HT Light Illuminated	Updated procedure with the 60XR style.
EMER PRESS Light Illuminated	Updated procedure with the 60XR style.
Loss Of Pressurization Indicator	Updated procedure with the 60XR style.
Overpressurization (Differential Pressure Exceeds 9.8 psid)	Updated procedure with the 60XR style.
Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet	The pressurization loss cause events are now in a list. Added note - If cabin temperature becomes hot. Updated procedure with the 60XR style.
FD Flag Illuminated on EIS	Removed “invalid” from “sensor signal”.

MACH TRIM Light Only Illuminated	Updated procedure with the 60XR style. Changed “below .77 Mi” to “0.77 Mi or below”. Added “This checklist is complete”.
MACH TRIM and PITCH TRIM Lights Illuminated	Changed “below .77 Mi” to “0.77 Mi or below”.
PITCH TRIM Light Illuminated in Flight	Updated procedure with the 60XR style. Added “This checklist is complete”.
SPOILER MON Light Illuminated in Flight	Updated procedure with the 60XR style. Added “This checklist is complete”.
Stall Warning System Failure	Updated description with the 60XR style.
Fuel Quantity Indicator Error Displayed	Updated procedure with the 60XR style.
Standby Pump Fails to Shut Off	Updated procedure with the 60XR style. Added “This checklist is complete”.
Hydraulic System Failure/Alternate Gear Extension	Updated steps and sub-steps with the 60XR style.
Comparator Warning	Added “Compare indications with magnetic compass to determine faulty system”. Changed sequence of “Autopilot and Yaw Damper” & “HEADING SLAVE-FREE” Steps.
Flight Management System (FMS) Failure	Updated procedure with the 60XR style. Added “This checklist is complete”. Incorporated TFM 2009-01 — CDU DATA BUS FAIL (Red).
Dual Air Data Computer (ADC) Failure	Updated step and sub-step sequence with the 60XR style.
Radio Tuning Unit (RTU) Failure	Updated step and sub-step sequence with the 60XR style.
Anti-skid Light Illuminated — Anti-skid Off Operation	Updated steps and sub-steps with the 60XR style.
Alternate Gear Extension/Electrical Malfunction	Updated steps and sub-steps with the 60XR style. Added “This checklist is complete”.
Operation with Nosewheel Steering Inoperative	Updated steps with the 60XR style.

Stabilizer Heat Failure Landing	Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Wing Heat Failure Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Wing and Stabilizer Heat Failure Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Normal Electrical System Failure Landing	Added “Landing Configuration — Flaps - UP”. Updated Flaps step. Changed Circuit Breakers step to “Set”.
Single Engine Landing	Changed Circuit Breakers step to “Set”. Updated Flaps step.
Aileron Jammed Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Elevator Jammed Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
One or Both Spoilers Up Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Partial Flaps Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Rudder Jammed Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Spoiler Failed Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.

Stabilizer Jammed Landing	Clarified Pull Force and Push Force conditions. Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Hydraulic System Failure Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Relocated ENG SYNC Switch step. Updated steps and sub-steps with the 60XR style.
Gear Up Landing	Changed Circuit Breakers step to “Set”.
Thrust Reverser Deployed Landing	Updated Flaps step. Changed Circuit Breakers step to “Set”. Updated steps and sub-steps with the 60XR style.
Failure of Thrust Reverser to Stow after Landing	Changed Circuit Breakers step to “Set”.
TR Arm Light in Flight	Changed Circuit Breaker step to “Set”. Added “This checklist is complete”.
TR Unlock Light Illuminated	Changed Circuit Breakers step to “Set”.
Turbulent Air Penetration	Updated steps with the 60XR style.

SECTION V — Performance

Takeoff	Removed “for 8° and 20° flap settings” from TAKEOFF FLIGHT PATH Charts.

Subject: *Learjet 60 Flight manual* — FM-123 Change 37

Filing instructions for Change 37 to the Airplane Flight Manual FM-123 are as follows:

NOTE: - Remove old pages and insert new pages as detailed below.

- When pages of this revision have been implemented, discard instruction page and all obsolete pages.

Filing Instructions

1. Retain following Temporary Flight Manual changes to use in step 6 (if applicable): TFM 93-02, TFM 93-03, TFM 93-04, TFM 93-05, TFM 94-20, TFM 94-21, and TFM 94-22.
2. The following Temporary Flight Manual changes were incorporated at change 37 and should be discarded: TFM 2009-01 (3 sheets) and TFM 2009-03 (7 sheets) .
3. Replace all pages prior to the Limitations tab with with Change 37 pages except “Title”, “Aircraft Configuration”, “Important to Owner”, and “User Comment Sheet”.
4. Replace all pages in LIMITATIONS, NORMAL PROCEDURES, EMERGENCY PROCEDURES and ABNORMAL PROCEDURES sections with Change 37 pages.
5. Replace page 5-48 in PERFORMANCE section with Change 37 page.
6. Insert Temporary Flight Manual changes from step 1 as follows (if applicable):
   a. TFM 93-02 insert after page 1-12.
   b. TFM 93-03 insert after page 1-14.
   c. TFM 93-04 insert after page 2-62.
   d. TFM 93-05 insert after page 2-24.
   e. TFM 94-20 insert after page 2-106.
   f. TFM 94-21 insert after page 3-38.
   g. TFM 94-22 insert after page 4-78.

AIRCRAFT CONFIGURATION

Assigned to Aircraft Serial Number _____

This list is intended to assist the flight crew in determining whether configuration changes have been made which affect the use of AFM procedures. Only those configurations which are referenced in the AFM need be listed here. It is the responsibility of the aircraft owner and operator to maintain this list. Insert this list behind the AFM title page.

DATE	CONFIGURATION OF:
	Certified Takeoff Weight =
	Autopilot =
	FMS & Software Version =
	Pressurization System =
	Thrust Reverser System =
	Aircraft Batteries =
	Cabin Aux Heater =
	Engine Diagnostic System =
	Autospoiler Wheel Speed Detection =
	Crew Oxygen Masks Installed =
	OTHER ITEMS:

Continued

Aircraft Configuration

DATE	CONFIGURATION OF:

LOG OF TEMPORARY FLIGHT MANUAL CHANGES

This list is intended to assist the flight crew in determining the applicable AFM temporary flight manual changes for Model 60 aircraft. It is the responsibility of the aircraft owner and operator to maintain their basic AFM with the temporary changes applicable to their aircraft. Insert this list after the AIRCRAFT CONFIGURATION page.

TFM # Dated	Section or Page	Description	Status
93-01 3-29-93	4-20	Engine Diagnostic System.	Removed by Chg 4
93-02 4-1-93	I	Autopilot/Flight Director System limits. (Aircraft 60-005 and 60-009 only.)	Active, until ECR 3624 or equivalent is accomplished.
93-03 4-1-93	I	Flight Management System limits. (Aircraft 60-005 and 60-009 only.)	Active, until ECR 3625 or equivalent is accomplished.
93-04 4-1-93	II	Lateral mode function. (Aircraft 60-005 and 60-009 only.)	Active, until ECR 3624 or equivalent is accomplished.
93-05 4-1-93	II	BEFORE TAKEOFF checklist. (Aircraft 60-005 and 60-009 only.)	Active, until ECR 3625 or equivalent is accomplished.
93-06 5-28-93	2-57	OSS-GPS listing. (Aircraft 60-004 thru 60-009.)	Removed by Chg 4
93-07 9-1-93	I	VLF format on the SDU.	Removed by Chg 7
93-12 9-17-93	C	Performance Data. (Aircraft 60-014 only.)	Removed by Chg 10
93-13 9-17-93	V	Performance Data. (Aircraft 60-014 only.)	Removed by Chg 10
93-19 12-3-93	2-34	Cold weather operations.	Removed by Chg 8
93-23 12-21-93	2-51	Autopilot and yaw damper.	Removed by Chg 9
94-01 3-15-94	4-21	Engine computer annunciators.	Removed by Chg 10
94-02 3-15-94	4-22	Engine computer annunciators.	Removed by Chg 10

Continued

TFM # Dated	Section or Page	Description	Status
94-03 3-15-94	4-23	Engine computer annunciators.	Removed by Chg 10
94-04 2-17-94	5-85	Wet runway landing factor.	Removed by Chg 9
94-10 7-8-94	2-63	AUX HT System.	Removed by Chg 10
94-11 8-19-94	2-80	Thrust reverser “Normal Stow”.	Superseded by TFM 94-20
94-12 8-19-94	3-36	TR UNLOCK/TR DEPLOY and ENG CMPTR annunciators.	Superseded by TFM 94-21
94-13 8-19-94	4-57	TR UNLOCK LIGHT ILLUMINATED. (Aircraft 60-041 thru 60-045 only.)	Superseded by TFM 94-22
94-20 11-28-94	II	Thrust reverser “Normal Stow”. (Aircraft 60-041 thru 60-046 only.)	Active, until SB 60-78-4 is accomplished.
94-21 11-28-94	III	TR UNLOCK/TR DEPLOY and ENG CMPTR annunciators. (Aircraft 60-041 thru 60-046 only.)	Active, until SB 60-78-4 is accomplished.
94-22 11-28-94	IV	TR UNLOCK LIGHT ILLUMINATED. (Aircraft 60-041 thru 60-046 only.)	Active, until SB 60-78-4 is accomplished.
95-06 9-17-95	1-14	Collins FMS.	Removed by Chg 14
95-10 6-29-95	4-21	Engine computer annunciators.	Removed by Chg 14
95-11 6-29-95	4-22	Engine computer annunciators.	Removed by Chg 14
95-12 6-29-95	4-23	Engine computer annunciators.	Removed by Chg 14
95-13 7-14-95	1-14	Collins FMS.	Removed by Chg 14
95-14 7-14-95	2-56A	Collins FMS.	Removed by Chg 14
95-15 11-2-95	4-39.1	Collins FMS.	Removed by Chg 15
96-01 11-19-96	1-18.2	Collins GPS 4000.	Removed by Chg 15
96-02 11-19-96	1-19.2	Collins GPS 4000.	Removed by Chg 15
96-03 11-19-96	2-58.2	Collins GPS 4000.	Removed by Chg 15
96-10 7-12-96	I	Paved runway restriction.	Removed by Chg 16

Continued

TFM # Dated	Section or Page	Description	Status
96-13 9-20-96	1-18.2	Collins GPS 4000.	Removed by Chg 16
96-17 1-20-97	1-17	Dual UNS-1B sv 405/505.	Removed by Chg 16
96-18 1-20-97	1-17.4	Dual UNS-1C.	Removed by Chg 16
2003-01 4-8-2003	4-35	SPOILER MON Light procedure.	Removed by Chg 30
2003-02 4-8-2003	4-63	SPOILERS FAILED landing procedure.	Removed by Chg 30
2003-03 4-1-2003	I and II	Improved use of anti-icing systems.	Removed by Chg 30
2003-11 11-17-2003	2-30	Highlights the importance of having nose wheel firmly on runway before thrust reverser deployment.	Removed by Chg 31
2004-14 10-12-2004	4-39 4-49	Alternate Gear Extension procedures.	Removed by Chg 32
2005-02 2-9-2005	4-40 4-49	Alternate Gear Extension procedures.	Superseded by TFM 2005-08
2005-05 7-14-2005	1-24	Starter duty cycle.	Removed by Chg 35
2005-07 8-5-2005	1-24 2-31	Thrust reverser cutout speed.	Removed by Chg 35
2005-04 8-9-2005	3-3 3-6	Dual Generator Failure procedure.	Removed by Chg 35
2005-08 9-15-2005	4-40 4-49	Alternate Gear Extension procedures.	Removed by Chg 35
2005-14 12-21-2005	1-1	Add limitation for icing and frost conditions.	Removed by Chg 35
2007-10 7-16-2007	3-16	Cabin Fire procedure.	Removed by Chg 36
2007-08 10-3-2007	3-31	Stall Warning Activates procedure.	Removed by Chg 36
2009-01 3-23-2009	1-20.9 2-62.9 4-43	Dual UNS-1E Software 802.x adds System Limit	Removed by Chg 37
2009-03 3-9-2009	1-25 2-3 2-4 2-7 3-32	Tire Limitation and Thrust Reveser Inadvertent Stow	Removed by Chg 37

TFM # Dated	Section or Page	Description	Status

LIST OF EFFECTIVE PAGES

Use this List of Effective Pages to determine the current status of the Airplane Flight Manual. Pages affected by the current change are indicated by an asterisk (*) immediately preceding the page number.

Dates of issue for Original and Changed pages are:

Original	O	1-15-93	Change	19	3-9-98
Change	1	3-25-93	Change	20	5-28-98
Change	2	4-1-93	Change	21	6-15-98
Change	3	5-7-93	Change	22	11-25-98
Change	4	8-13-93	Change	23	3-15-99
Change	5	9-10-93	Change	24	8-17-99
Change	6	10-8-93	Change	25	3-22-2000
Change	7	12-16-93	Change	26	7-19-2000
Change	8	3-18-94	Change	27	3-22-2001
Change	9	6-8-94	Change	28	10-9-2001
Change	10	9-14-94	Change	29	1-13-2003
Change	11	11-10-94	Change	30	6-24-2003
Change	12	2-14-95	Change	31	11-20-2003
Change	13	4-14-95	Change	32	1-4-2005
Change	14	9-15-95	Change	33	6-20-2005
Change	15	6-28-96	Change	34	1-11-2006
Change	16	5-9-97	Change	35	6-6-2006
Change	17	6-13-97	Change	36	2-19-2008
Change	18	9-11-97	Change	37	11-30-2009

NOTE

This change supersedes and incorporates TFM 2009-01 and TFM 2009-03. Remove superseded temporary changes from AFM.

The pages in this manual and this list show the aircraft applicability of the pages. Only the pages applicable to the aircraft assigned to this Flight Manual must be retained. Pages not applicable to the aircraft may be removed from the Flight Manual.

Page	Change	Aircraft Affected
*Title	O	All
*A thru L	37	All
*M (added)	37	All

FAA Approved D M Baker **Date** 11/30/09

for MARGARET KLINE, MANAGER
AIRCRAFT CERTIFICATION OFFICE
FEDERAL AVIATION ADMINISTRATION
WICHITA, KANSAS

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*i thru v	37	All
*vi thru viii (added)	37	All
Limitations		
*I-1 thru I-3	37	All
*1-1 thru 1-8	37	All
*1-9	37	Aircraft 60-001 thru 60-248
*1-9.1	37	Aircraft 60-249 & Subsequent
*1-10 thru 1-17	37	All
*1-17.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403 or sv 404
*1-17.2 (deleted)	37	Aircraft with Dual Collins
*1-17.3 (deleted)	37	Aircraft with Single Collins
*1-17.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*1-17.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*1-17.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*1-17.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*1-17.8 (deleted)	37	Aircraft with UNS-1E sv 801
*1-17.9 (deleted)	37	Aircraft with UNS-1E sv 802
*1-18	37	All
*1-18.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403 or sv 404
*1-18.2 (deleted)	37	Aircraft with Dual Collins
*1-18.3 (deleted)	37	Aircraft with Single Collins
*1-18.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*1-18.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*1-18.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*1-18.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*1-18.8 (deleted)	37	Aircraft with UNS-1E sv 801
*1-18.9 (deleted)	37	Aircraft with UNS-1E sv 802
*1-19	37	Aircraft with UNS-1B sv 405/505
*1-19.1	37	Aircraft with UNS-1B sv 402, sv 403 or sv 404
*1-19.2	37	Aircraft with Dual Collins
*1-19.3	37	Aircraft with Single Collins
*1-19.4	37	Aircraft with UNS-1C sv 600/700
*1-19.5	37	Aircraft with UNS-1C sv 601/701
*1-19.6	37	Aircraft with UNS-1C sv 602/702
*1-19.7	37	Aircraft with UNS-1C sv 604/704
*1-19.8	37	Aircraft with UNS-1E sv 801
*1-19.9	37	Aircraft with UNS-1E sv 802

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*1-20	37	Aircraft with UNS-1B sv 405/505
*1-20.1	37	Aircraft with UNS-1B sv 402, sv 403, or sv 404
*1-20.2	37	Aircraft with Dual Collins
*1-20.3	37	Aircraft with Single Collins
*1-20.4	37	Aircraft with UNS-1C sv 600/700
*1-20.5	37	Aircraft with UNS-1C sv 601/701
*1-20.6	37	Aircraft with UNS-1C sv 602/702
*1-20.7	37	Aircraft with UNS-1C sv 604/704
*1-20.8	37	Aircraft with UNS-1E sv 801
*1-20.9	37	Aircraft with UNS-1E sv 802
*1-21	37	Aircraft with UNS-1B sv 405/505
*1-21.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403, or sv 404
*1-21.2 (added)	37	Aircraft with Dual Collins
*1-21.3 (added)	37	Aircraft with Single Collins
*1-21.4 (added)	37	Aircraft with UNS-1C sv 600/700
*1-21.5 (added)	37	Aircraft with UNS-1C sv 601/701
*1-21.6 (added)	37	Aircraft with UNS-1C sv 602/702
*1-21.7 (added)	37	Aircraft with UNS-1C sv 604/704
*1-21.8 (added)	37	Aircraft with UNS-1E sv 801
*1-21.9 (added)	37	Aircraft with UNS-1E sv 802
*1-22	37	Aircraft with UNS-1B sv 405/505
*1-22.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403, or sv 404
*1-22.2 (added)	37	Aircraft with Dual Collins
*1-22.3 (added)	37	Aircraft with Single Collins
*1-22.4 (added)	37	Aircraft with UNS-1C sv 600/700
*1-22.5 (added)	37	Aircraft with UNS-1C sv 601/701
*1-22.6 (added)	37	Aircraft with UNS-1C sv 602/702
*1-22.7 (added)	37	Aircraft with UNS-1C sv 604/704
*1-22.8 (added)	37	Aircraft with UNS-1E sv 801
*1-22.9 (added)	37	Aircraft with UNS-1E sv 802
*1-23	37	Aircraft with UNS-1B sv 405/505
*1-23.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403, or sv 404
*1-23.2 (added)	37	Aircraft with Dual Collins
*1-23.3 (added)	37	Aircraft with Single Collins
*1-23.4 (added)	37	Aircraft with UNS-1C sv 600/700
*1-23.5 (added)	37	Aircraft with UNS-1C sv 601/701
*1-23.6 (added)	37	Aircraft with UNS-1C sv 602/702
*1-23.7 (added)	37	Aircraft with UNS-1C sv 604/704
*1-23.8 (added)	37	Aircraft with UNS-1E sv 801
*1-23.9 (added)	37	Aircraft with UNS-1E sv 802

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*1-24 thru 1-34	37	All
*1-35 thru 1-39 (added)	37	All
Normal Procedures		
*II-1 and II-4	37	All
*2-1 thru 2-55	37	All
*2-56	37	All
*2-56.1 (deleted)	37	Aircraft with Single/Dual Collins
*2-56.2 (deleted)	37	Aircraft with UNS-1C
*2-56.3 (deleted)	37	Aircraft with UNS-1E
*2-57	37	All
*2-57.1 (deleted)	37	Aircraft with Single/Dual Collins
*2-57.2 (deleted)	37	Aircraft with UNS-1C
*2-57.3 (deleted)	37	Aircraft with UNS-1E
*2-58	37	All
*2-58.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403, or sv 404
*2-58.2 (deleted)	37	Aircraft with Dual Collins
*2-58.3 (deleted)	37	Aircraft with Single Collins
*2-58.4 (deleted)	37	Aircraft with UNS-1C
*2-58.5 (deleted)	37	Aircraft with UNS-1E
*2-59	37	All
*2-59.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403, or sv 404
*2-59.2 (deleted)	37	Aircraft with Dual Collins
*2-59.3 (deleted)	37	Aircraft with Single Collins
*2-59.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-59.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-59.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-59.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-59.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-59.9 (deleted)	37	Aircraft with UNS-1E sv 802
*2-60	37	All
*2-60.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403 or sv 404
*2-60.2 (deleted)	37	Aircraft with Dual Collins
*2-60.3 (deleted)	37	Aircraft with Single Collins
*2-60.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-60.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-60.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-60.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-60.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-60.9 (deleted)	37	Aircraft with UNS-1E sv 802

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*2-61	37	All
*2-61.1(deleted)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-61.2 (deleted)	37	Aircraft with Dual Collins
*2-61.3 (deleted)	37	Aircraft with Single Collins
*2-61.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-61.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-61.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-61.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-61.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-61.9 (deleted)	37	Aircraft with UNS-1E sv 802
*2-62	37	All
*2-62.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403, sv 404
*2-62.2 (deleted)	37	Aircraft with Dual Collins
*2-62.3 (deleted)	37	Aircraft with Single Collins
*2-62.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-62.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-62.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-62.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-62.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-62.9 (deleted)	37	Aircraft with UNS-1E sv 802
*2-63	37	All
*2-63.1 (deleted)	37	Aircraft with UNS-1B sv 402, sv 403, sv 404
*2-63.2 (deleted)	37	Aircraft with Dual Collins
*2-63.3 (deleted)	37	Aircraft with Single Collins
*2-63.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-63.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-63.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-63.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-63.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-63.9 (deleted)	37	Aircraft with UNS-1E sv 802
*2-64	37	All
*2-64.1(deleted)	37	Aircraft with UNS-1B sv 402, sv 403, sv 404
*2-64.2 (deleted)	37	Aircraft with Dual Collins
*2-64.3 (deleted)	37	Aircraft with Single Collins
*2-64.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-64.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-64.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-64.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-64.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-64.9 (deleted)	37	Aircraft with UNS-1E sv 802

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*2-65	37	Aircraft with UNS-1B
*2-65.1	37	Aircraft with Single/Dual Collins
*2-65.2	37	Aircraft with UNS-1C
*2-65.3	37	Aircraft with UNS-1E
*2-65.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-65.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-65.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-65.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-65.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-65.9 (deleted)	37	Aircraft with UNS-1E sv 802
*2-66	37	Aircraft with UNS-1B
*2-66.1	37	Aircraft with Single/Dual Collins
*2-66.2	37	Aircraft with UNS-1C
*2-66.3	37	Aircraft with UNS-1E
*2-66.4 (deleted)	37	Aircraft with UNS-1C sv 600/700
*2-66.5 (deleted)	37	Aircraft with UNS-1C sv 601/701
*2-66.6 (deleted)	37	Aircraft with UNS-1C sv 602/702
*2-66.7 (deleted)	37	Aircraft with UNS-1C sv 604/704
*2-66.8 (deleted)	37	Aircraft with UNS-1E sv 801
*2-66.9 (deleted)	37	Aircraft with UNS-1E sv 802
*2-66A (deleted)	37	All
*2-67	37	Aircraft with UNS-1B SV 405/505
*2-67.1(added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-67.2 (added)	37	Aircraft with Dual Collins
*2-67.3 (added)	37	Aircraft with Single Collins
*2-67.4 (added)	37	Aircraft with UNS-1C
*2-67.8 (added)	37	Aircraft with UNS-1E
*2-68	37	Aircraft with UNS-1B sv 405/505
*2-68.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-68.2 (added)	37	Aircraft with Dual Collins
*2-68.3 (added)	37	Aircraft with Single Collins
*2-68.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-68.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-68.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-68.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-68.8 (added)	37	Aircraft with UNS-1E sv 801
*2-68.9 (added)	37	Aircraft with UNS-1E sv 802

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*2-69	37	Aircraft with UNS-1B sv 405/505
*2-69.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-69.2 (added)	37	Aircraft with Dual Collins
*2-69.3 (added)	37	Aircraft with Single Collins
*2-69.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-69.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-69.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-69.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-69.8 (added)	37	Aircraft with UNS-1E sv 801
*2-69.9 (added)	37	Aircraft with UNS-1E sv 802
*2-70	37	Aircraft with UNS-1B sv 405/505
*2-70.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-70.2 (added)	37	Aircraft with Dual Collins
*2-70.3 (added)	37	Aircraft with Single Collins
*2-70.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-70.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-70.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-70.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-70.8 (added)	37	Aircraft with UNS-1E sv 801
*2-70.9 (added)	37	Aircraft with UNS-1E sv 802
*2-71	37	Aircraft with UNS-1B sv 405/505
*2-71.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-71.2 (added)	37	Aircraft with Dual Collins
*2-71.3 (added)	37	Aircraft with Single Collins
*2-71.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-71.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-71.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-71.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-71.8 (added)	37	Aircraft with UNS-1E sv 801
*2-71.9 (added)	37	Aircraft with UNS-1E sv 802
*2-72	37	Aircraft with UNS-1B sv 405/505
*2-72.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-72.2 (added)	37	Aircraft with Dual Collins
*2-72.3 (added)	37	Aircraft with Single Collins
*2-72.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-72.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-72.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-72.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-72.8 (added)	37	Aircraft with UNS-1E sv 801
*2-72.9 (added)	37	Aircraft with UNS-1E sv 802

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
*2-73	37	Aircraft with UNS-1B sv 405/505
*2-73.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-73.2 (added)	37	Aircraft with Dual Collins
*2-73.3 (added)	37	Aircraft with Single Collins
*2-73.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-73.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-73.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-73.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-73.8 (added)	37	Aircraft with UNS-1E sv 801
*2-73.9 (added)	37	Aircraft with UNS-1E sv 802
*2-74	37	Aircraft with UNS-1B sv 405/505
*2-74.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-74.2 (added)	37	Aircraft with Dual Collins
*2-74.3 (added)	37	Aircraft with Single Collins
*2-74.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-74.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-74.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-74.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-74.8 (added)	37	Aircraft with UNS-1E sv 801
*2-74.9 (added)	37	Aircraft with UNS-1E sv 802
*2-74A thru 2-74C (deleted)	37	All
*2-75	37	Aircraft with UNS-1B sv 405/505
*2-75.1 (added)	37	Aircraft with UNS-1B sv 402, sv 403 and sv 404
*2-75.2 (added)	37	Aircraft with Dual Collins
*2-75.3 (added)	37	Aircraft with Single Collins
*2-75.4 (added)	37	Aircraft with UNS-1C sv 600/700
*2-75.5 (added)	37	Aircraft with UNS-1C sv 601/701
*2-75.6 (added)	37	Aircraft with UNS-1C sv 602/702
*2-75.7 (added)	37	Aircraft with UNS-1C sv 604/704
*2-75.8 (added)	37	Aircraft with UNS-1E sv 801
*2-75.9 (added)	37	Aircraft with UNS-1E sv 802
*2-76 thru 2-95	37	All
*2-96 thru 2-106 (added)	37	All

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
Emergency Procedures		
*III-1 thru III-2	37	All
*3-1 thru 3-10	37	All
*3-10A (deleted)	37	All
*3-11 thru 3-34	37	All
*3-35 thru 3-39 (added)	37	All
Abnormal Procedures		
*IV-1 thru IV-4	37	All
*4-1 thru 4-12	37	All
*4-12A and 4-12B (deleted)	37	All
*4-13 thru 4-18	37	All
*4-18A and 4-18B (deleted)	37	All
*4-19 thru 4-30	37	All
*4-30.1 (deleted)	37	All
*4-31 thru 4-35	37	All
*4-36	37	Aircraft 60-001 thru 60-103
*4-36A (deleted)	37	All
*4-36.1 (added)	37	Aircraft 60-104 & Subsequent
*4-37 thru 4-43	37	All
*4-43.1 (deleted)	37	Aircraft with Single/Dual Collins
*4-44 thru 4-48	37	All
*4-49	37	Aircraft with UNS FMS
*4-49.1 (added)	37	Aircraft with Single/Dual Collins
*4-50 thru 4-52	37	All
*4-53	37	Aircraft with UNS FMS
*4-53.1	37	Aircraft with Single/Dual Collins
*4-54 thru 64	37	All
*4-64A and 4-64B (deleted)	37	All
*4-65 thru 4-72	37	All
*4-73 thru 79 (added)	37	All

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
Performance Data		
V-1	15	All
V-2	25	All
V-3	15	All
V-4	25	All
5-1	O	All
5-2	15	All
5-3	O	All
5-4	35	All
5-5 and 5-6	O	All
5-7	27	All
5-8	6	All
5-9 and 5-10	O	All
5-11 and 5-12	36	All
5-13 thru 5-19	O	All
5-20	28	Aircraft 60-001 thru 60-248
5-20.1	28	Aircraft 60-249 & Subsequent
5-21 thru 5-23	O	All
5-24	29	Aircraft 60-001 thru 60-248
5-24.1	28	Aircraft 60-249 & Subsequent
5-25	16	Aircraft 60-001 thru 60-113
5-25.1	16	Aircraft 60-114 & Subsequent
5-26 thru 5-28	O	All
5-29	28	Aircraft 60-001 thru 60-248
5-29.1	28	Aircraft 60-249 & Subsequent
5-30 thru 5-33	O	All
5-34 thru 5-36	11	All
5-37 and 5-38	O	All
5-39	11	All
5-39A	11	All
5-40	O	All
5-41	11	All
5-41A	11	All
5-42 and 5-43	11	All
5-43A	11	All
5-44 and 5-45	11	All
5-46	O	All
5-46A and 5-46B	25	All
5-47	12	All
*5-48	37	All
5-49 and 5-50	O	All
5-51	11	All

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
5-52	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-52.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-53 and 5-54	11	All
5-55	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-55.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-56	11	All
5-57	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-57.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-58 thru 5-62	11	All
5-63	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-63.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-64	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-64.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-65	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-65.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-66	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-66.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-67 and 5-68	11	All
5-69	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-69.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-70	11	All
5-71	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-71.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-72 thru 5-76	11	All

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
5-77	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-77.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-78	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
5-78.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
5-79	11	All
5-80 and 5-81	O	All
5-82	36	All
5-83	28	All
5-84	25	All
5-84A and 5-84B	25	All
5-85	21	All
5-86 and 5-87	O	All
5-88 and 5-89	11	All
5-90	16	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-90.1	16	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6
5-91	15	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-91.1	21	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6
5-92	16	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-92.1	16	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6
5-93	15	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-93.1	35	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6
5-94	16	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-94.1	29	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6

LIST OF EFFECTIVE PAGES (Cont)

Page	Change	Aircraft Affected
5-95	16	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-95.1	16	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6
5-96	21	Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6
5-96.1	21	Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6
5-97	29	All
Weight and Balance		
VI-1	11	All
6-1	11	All
6-2	11	Aircraft 60-001 thru 60-048 with standard 22,750 Lb takeoff weight
6-2.1	11	Aircraft 60-049 and Subsequent with standard 22,750 Lb takeoff weight
6-2.2	11	Aircraft with optional 23,100 Lb takeoff weight
6-2.3	11	Aircraft with optional 23,500 Lb takeoff weight
6-3	11	All
6-4	8	All
6-5 thru 6-9	O	All
6-10	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
6-10.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
6-11	11	Aircraft 60-049 & Subsequent and prior aircraft incorporating SB 60-8-1
6-11.1	11	Aircraft 60-001 thru 60-048 not incorporating SB 60-8-1
6-12	O	All
6-13	8	All
6-14	O	All
6-15	1	All
6-16	8	All

INTRODUCTION

THIS AIRPLANE FLIGHT MANUAL MUST BE CARRIED IN THE AIRCRAFT AT ALL TIMES.

NOTICE

This Airplane Flight Manual has been prepared by Learjet, Inc. Its entire contents are the result of design, engineering, testing, and manufacturing efforts proprietary to Learjet, Inc. It is to be used solely in connection with the operation and care of Learjet aircraft and is to be transferred only with the aircraft. It is not to be duplicated or its contents used for any purpose beyond the operation and care of the aircraft without the prior written consent of Learjet, Inc.

THE MANUAL

The manual consists of this introduction and the following basic sections:

Section I — LIMITATIONS containing FAA approved operating limitations which must be observed, except where a deviation is specifically authorized, during operation of the aircraft.

Section II — NORMAL PROCEDURES containing FAA approved operating procedures for the aircraft and its systems which may be considered routine in day-to-day operations.

Section III — EMERGENCY PROCEDURES containing FAA approved operating procedures requiring the use of special systems and/or regular systems in order to protect the occupants and the aircraft from harm during a critical condition requiring immediate response. Steps of procedures emphasized by enclosure in a box such as this  and boldfaced should be accomplished without the aid of the checklist (memorized). Data that is enclosed in a box but **not** boldfaced need not be memorized.

Section IV — ABNORMAL PROCEDURES containing FAA approved operating procedures requiring the use of special systems and/or alternate use of regular systems which, if followed, will maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure condition.

Section V — PERFORMANCE containing FAA approved data defining the aircraft performance under standard performance conditions. Refer to **FLIGHT MANUAL PERFORMANCE DATA** in this Introduction.

Section VI — WEIGHT AND BALANCE DATA containing FAA approved data intended to assist the operator in ensuring that the aircraft is properly loaded.

Section VII — SUPPLEMENTS & APPENDICES containing Approved Airplane Flight Manual Supplements and Appendices. Supplements contain operating limitations, procedures, and performance data and other necessary data for aircraft conducting special operations and/or equipped with specific equipment requiring the supplement. Appendices contain ancillary information which may or may not be required for the operation of the aircraft.

Section VIII — WET/CONTAMINATED RUNWAY DATA contains guidance material intended to assist the operator in operating on a wet or contaminated runway.

Section IX — ADDENDA contains servicing and operational data intended to assist the operator in routine service and operation.

Section I through Section VI is composed of material approved by the Federal Aviation Administration and together with the FAA Approved Airplane Flight Manual Supplements and Appendices in Section VII constitute the FAA Approved Airplane Flight Manual. Sections VIII (Wet/Contaminated Runway Data) and IX (Addenda) are not FAA approved material but are included in this manual for the operator's convenience.

NOTE

- A weight and balance data package, which is not FAA Approved, is provided by the manufacturer at time of initial aircraft delivery. This package provides data specific to one aircraft and although not FAA Approved, may be kept with this manual for operator's convenience.
- Section IX (Addenda) contains addendum, each of which covers a separate subject.

REVISING THE MANUAL

The data presented in this manual is the result of extensive flight tests and has been approved by the Federal Aviation Administration. However, development does not stop with the issuance of this manual and as new procedures are developed they will be forwarded to the holder of this manual. Revised material will be in the form of Temporary Flight Manual Changes or Numbered Changes. It is the responsibility of the operator to ensure that the Flight Manual is current at all times. Therefore, it is very important that changes (temporary or numbered) be incorporated in the manual as soon as they are received.

TEMPORARY FLIGHT MANUAL CHANGES

Temporary Flight Manual Changes may be issued against the Flight Manual when required. These changes generally contain material that is not so extensive as to require a Numbered Change and allow Learjet, Inc. to transmit revised data to the operator faster than with the Numbered Change system. Temporary Flight Manual Changes are printed on yellow paper and include all necessary information (Publication Affected, Description of Change, and Filing Instructions) on the change itself. Temporary Flight Manual Changes are to be retained in the Flight Manual until removed by some other authority — usually a superseding Temporary Change or a Numbered Change.

NUMBERED CHANGES

Numbered Changes issued against the Flight Manual differ from Temporary Flight Manual Changes in that the pages contained in the Numbered Change supersede like pages in the Flight Manual. Each page in a Numbered Change has a "Change" number located at the lower corner of the page immediately below the FAA APPROVED date. Portions of the text affected by the change are indicated by a vertical bar at the outer margin of the page. The vertical bars may not appear on pages that contain changes to graphs or tables. Additionally, when a "changed" page is the result of a rearrangement of material due to a change on a previous page no vertical bar will appear.

The List of Effective Pages provides the user with a guide to establish the current effective date of each page in the Flight Manual and an instruction sheet for incorporating the latest Numbered Change into the Flight Manual. Information included in the List of Effective Pages states the current Change Number for each page, the dates of Original issue and Numbered Changes, the airplane effectivity of performance figures, and the Temporary Flight Manual Changes the current Numbered Change supersedes. An asterisk (*) next to a page number indicates pages changed, added, or deleted by the current change.



Numbered Changes do not automatically supersede all outstanding Temporary Flight Manual Changes. Follow instructions given in "Note" on List of Effective Pages to determine which Temporary Flight Manual Changes to remove when incorporating a Numbered Change.

FLIGHT MANUAL PERFORMANCE DATA

The performance data in Section V of this manual provides performance data for all aircraft with the same model designation rather than performance data for a specific serial number aircraft. Therefore, due to serial number changes or the incorporation of Service Bulletins, performance charts may be issued against this Flight Manual which are not applicable to the specific aircraft assigned to the Flight Manual. Charts not effective for a particular aircraft may be removed from the Flight Manual for that aircraft and need not be retained. The airplane effectivity of each chart is listed on the page containing the chart and in the List of Effective Pages.



To assure that all charts required for your particular aircraft are retained, use special care and cross-check aircraft effectivities when removing charts or incorporating numbered changes.

NOTES, CAUTIONS, AND WARNINGS

Notes, Cautions, and Warnings are used throughout this manual to focus attention on special conditions or procedures as follows:



Notes are used to highlight specific operating conditions or steps of a procedure.



Cautions are used to call attention to operating procedures which, if not strictly observed, may result in damage to equipment.



Warnings are used to call attention to operating procedures which, if not strictly adhered to, may result in personal injury or loss of life.

MANUAL CONVENTIONS

SWITCH INDICATIONS

Toggle Switches — Positions are depicted by either referencing the actual labeling (indicated by the use of all capital letters [e.g., OFF]) or generic condition (e.g., Off and On). See samples below.

Pushbutton Switches (with annunciated status) — Switch legends will be presented in all capital letters (e.g., GRVTY XFR Switch). Annunciated switch status will be also be noted in all capital letters (e.g., GRVTY XFR Switch — ON). Switch conditions that are not illuminated will be lead capped (e.g., GRVTY XFR Switch — Off). See the following table for sample text as used in this manual:

xx

Sample Text	Definition
IGNITION Switch — OFF.	The pilot will place the toggle switch labeled IGNITION in the labeled OFF position.
IGNITION Switch — On.	The pilot will place the toggle switch labeled IGNITION in the on position. However, there is no labeled "ON" position.
GRVTY XFR Switch — Off.	The pilot will place the pushbutton switch labeled GRVTY XFR in the off condition. The absence of a switch annunciation indicates "off" is the normal condition for this system.
GRVTY XFR Switch — ON.	The pilot will place the pushbutton switch labeled GRVTY XFR in the on condition. An integral annunciator will illuminate "ON".

SYMBOLS AND "IF" STATEMENTS

Certain procedures are dependent on prescribed conditions. These conditions are presented as "If" statements.

"If" statements preceded by a symbol (e.g., ●, ■ or ▲) indicate more than one condition for that step. Alternate conditions for that step will be indicated by repeating that step and symbol.

Steps beginning with an "If" statement not preceded by a special symbol are accomplished only if the statement is true. There is no alternate condition(s) to be addressed at this level of the procedure. These statements are often *italicized* or **boldfaced** to distinguish them from the required action. If the statement is false, proceed to the next step in the sequence.

The following example shows two options for step 1. and two options for substep c. Procedures completed at any substep level will be noted. (e.g., This checklist is complete.) Procedures not completed at a substep level will direct the user to the next applicable step (e.g., Go to step 2.) The last procedure of any substep will either state "This checklist is complete." or "Go to step #.", or refer the user to another appropriate procedure.

Sample Text

1. ●**If source is known:**
   a. Protective Breathing Equipment — One crew member, don.
   b. Extinguish fire using hand-held extinguisher or eliminate the source of smoke or fumes.
   c. ■**If fire is not extinguished:**
      (1) Land as soon as possible.
      (2) This checklist is complete.
   c. ■**If fire is extinguished and can be visibly verified:**
      (1) Land as soon as practical. At the crew's discretion, the pressurization and oxygen systems may be returned to normal.
      (2) *If smoke or fumes continue,* One or Both BLEED AIR Switches — EMER until smoke or fumes are eliminated. Advancing thrust levers will increase airflow.
      (3) This checklist is complete.

1. ●**If source is not known,** go to step 2.

2. . . .

SAMPLE

CIRCUIT BREAKERS

Many procedures involve manipulating circuit breakers. The following criteria should be followed during "Circuit Breaker" steps.

- Circuit breakers that are "Set" should be checked for that normal condition. If the circuit breaker is not "Set", it may be reset only once. If the circuit breaker opens again, do not reset.
- Circuit breakers that "Pull" should only be pulled and not reset.
- Circuit breakers that "Pull and Reset" should be pulled, delay for several seconds, and reset only once.

Allow sufficient cooling time for circuit breakers that are "Reset" or cycled through a "Pull and Reset".

OTHER PUBLICATIONS

The following is a list of Learjet publications referenced in this Airplane Flight Manual. Such references in this manual are made by number and do not contain any revision indication. However, such references are to be understood as "the latest revision".

ENGINEERING CHANGE RECORDS (ECR)

ECR 3589 – Wiring Change to add OSS-GPS 1 to the Avionics Master.
ECR 3629 – Phase III Autopilot Improvement.
ECR 3771 – Auxiliary Cabin Heater Improvement.

SERVICE BULLETINS (SB)

SB 60-8-1	–	CG Expansion and TOGW Increase.
SB 60-21-3	–	Modification of the Pressurization System to allow Landings in excess of 8000 feet.
SB 60-21-4	–	Activation of Auxiliary Cabin Heating System.
SB 60-21-5	–	Installation of Electric Crew Foot Warmers.
SB 60-22-1	–	Installation of Collins Autopilot Phase III Improvement.
SB 60-27-6	–	Installation of Auto Spoiler Wheel Speed Detection System.
SB 60-28-10	–	Installation of Improved Fuel Quantity Indicator.
SB 60-30-2	–	Installation of Windshield Defog Dual Temperature Control.
SB 60-31-1	–	Modification of Cabin Altitude Warning System. Aircraft 60-037 and 60-255
SB 60-31-2	–	Modification of Cabin Altitude Warning System. Aircraft 60-003 thru 60-270, except 60-037 and 60-255

SB 60-34-2	–	Installation of UNS-1B 404 software and Advanced Performance Data Base.
SB 60-76-2	–	Replacement of LH and RH FADEC Wiring Harness.
SB 60-77-1	–	Activation of Engine Diagnostic System Fault Annunciator.
SB 60-78-1	–	Thrust Reverser Activation.
SB 60-78-2	–	Installation of Thrust Reverser Secondary Latches.

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GENERAL

CERTIFICATION STATUS

This airplane is certified in accordance with 14 CFR Part 25.

TYPE OF OPERATION

This airplane is approved for:

- VFR (Visual)
- IFR (Instrument)
- Day
- Night
- Icing

  Icing conditions exist when outside air temperature (OAT) on the ground and for takeoff is 10°C (50°F) or below, or the static air temperature (SAT) in flight is 10°C (50°F) to -40°C (-40°F), and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, or ice crystals).

  Icing conditions also exist when the OAT on the ground and for takeoff is 10°C (50°F) or below when operating on ramps, taxiways, or runways where surface snow, ice, standing water, or slush may be ingested by the engines, or freeze on engines, nacelles, or engine sensor probes.

  When icing or frost conditions exist, this airplane must be inspected and operated in accordance with the **Cold Weather Operation** procedures of Section II. These procedures include the requirement to assure that all critical surfaces of the airplane (wing, vertical and horizontal stabilizers, flight control surfaces, spoilers and flaps) are free of frost, ice and snow for takeoff. Conducting only a visual inspection may not detect very small levels of contamination; therefore, a tactile (hand on surface) check of the wing leading edge and adjacent wing upper surface is required when the ambient temperature is less than 10°C (50°F).

This airplane is not approved for ditching under 14 CFR 25.801.

PERFORMANCE CONFIGURATION

The airplane configuration must be as presented under **STANDARD PERFORMANCE CONDITIONS** in Section V.

MINIMUM FLIGHT CREW

The minimum flight crew shall consist of pilot and copilot.

WEIGHT AND C.G. LIMITS

MAXIMUM RAMP WEIGHT

- Standard ..... 23,000 Pounds
  10,433 kg
- Optional ..... 23,350 Pounds
  10,591 kg
- Optional ..... 23,750 Pounds
  10,773 kg

NOTE

Ramp Weight shall not exceed Maximum Allowable Takeoff Weight by more than 250 lbs (113 kg).

MAXIMUM CERTIFIED TAKEOFF WEIGHT

- Standard ..... 22,750 Pounds
  10,319 kg
- Optional ..... 23,100 Pounds
  10,478 kg
- Optional ..... 23,500 Pounds
  10,660 kg

NOTE

Refer to Takeoff Weight Limit Placard installed on the airplane instrument panel.

MAXIMUM ZERO FUEL WEIGHT

- *60-001 thru 60-048 not incorporating SB 60-8-1* ..... 16,500 Pounds
  7,484 kg
- *60-049 & subsequent and prior aircraft incorporating SB 60-8-1* ..... 17,000 Pounds
  7,711 kg

NOTE

All weights in excess of Maximum Zero Fuel Weight must consist of fuel.

MAXIMUM ALLOWABLE TAKEOFF WEIGHT

The takeoff weight is limited by the most restrictive of the following requirements:

- Maximum Certified Takeoff Weight.
- The Maximum Takeoff Weight with anti-skid OFF or anti-skid protection for any wheel inoperative is 18,500 pounds (8,391 kg).
- Maximum Takeoff Weight (Climb or Brake Energy Limited) for altitude and temperature as determined from the applicable figure entitled **TAKEOFF WEIGHT LIMIT** in Section V.
- Maximum Takeoff Weight for the runway and ambient conditions as determined from the applicable figure entitled **TAKEOFF FIELD LENGTH** in Section V.

WEIGHT AND C.G. LIMITS (Cont)

MAXIMUM CERTIFIED LANDING WEIGHT

- Maximum Certified Landing Weight .....19,500 Pounds
  8,845 kg

MAXIMUM ALLOWABLE LANDING WEIGHT

The landing weight is limited by the most restrictive of the following requirements:

- Maximum Certified Landing Weight.

NOTE

Perform Hard or Overweight Landing Inspection (Chapter 5, Learjet 60 Maintenance Manual) if Maximum Certified Landing Weight is exceeded.

- Maximum Landing Weight for the runway and ambient conditions as determined from the **ACTUAL LANDING DISTANCE** chart in Section V.
- Maximum Landing Weight (Approach Climb or Brake Energy Limited) for altitude and temperature as determined from the applicable figure entitled **LANDING WEIGHT LIMIT** in Section V.

NOTE

Perform High Energy Stop Inspection (Chapter 5, Learjet 60 Maintenance Manual) if the maximum brake energy weight for landing is exceeded during a landing or rejected takeoff using maximum braking effort.

CENTER-OF-GRAVITY

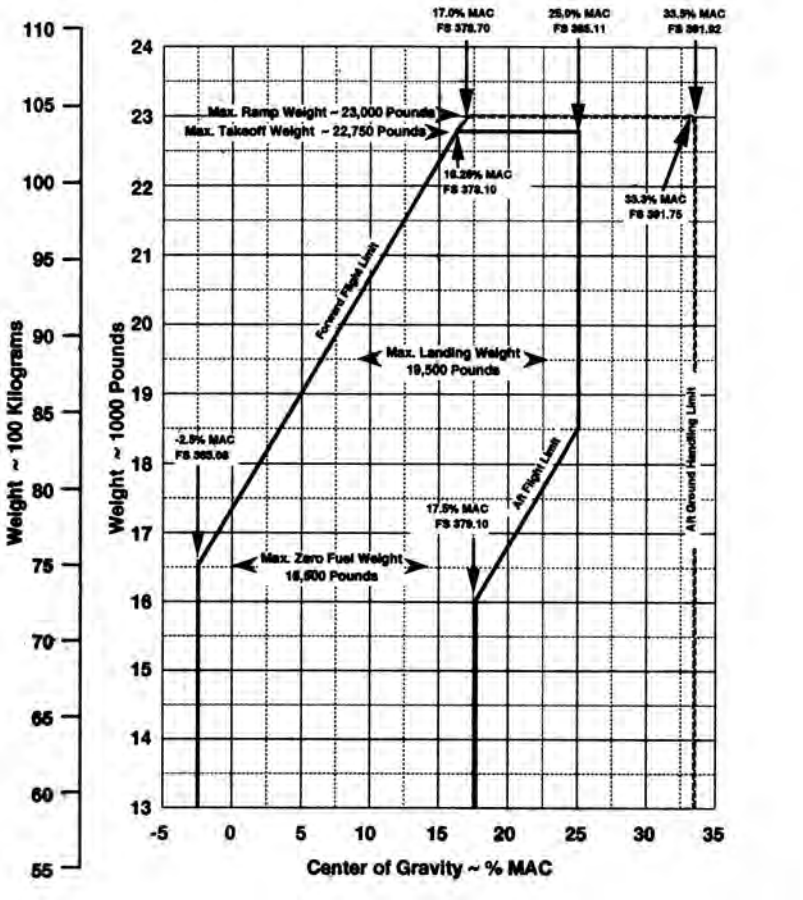
The center of gravity of the airplane for all flight and ground conditions must be maintained within the applicable **CENTER-OF-GRAVITY ENVELOPE** defined in Figure 1-1, 1-2, 1-3, or 1-4 in this section.

CAUTION

Loading the aircraft to a center-of-gravity aft of the ground handling limit may cause the aircraft to tip over.

CENTER-OF-GRAVITY ENVELOPE

Standard 22,750 LB (10,319 Kg) Takeoff Weight
60-001 thru 60-048



Forward Flight Limit — F.S.363.08 (-2.5% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.10 (16.25% MAC) at 22,750 pounds (10,319 kg).

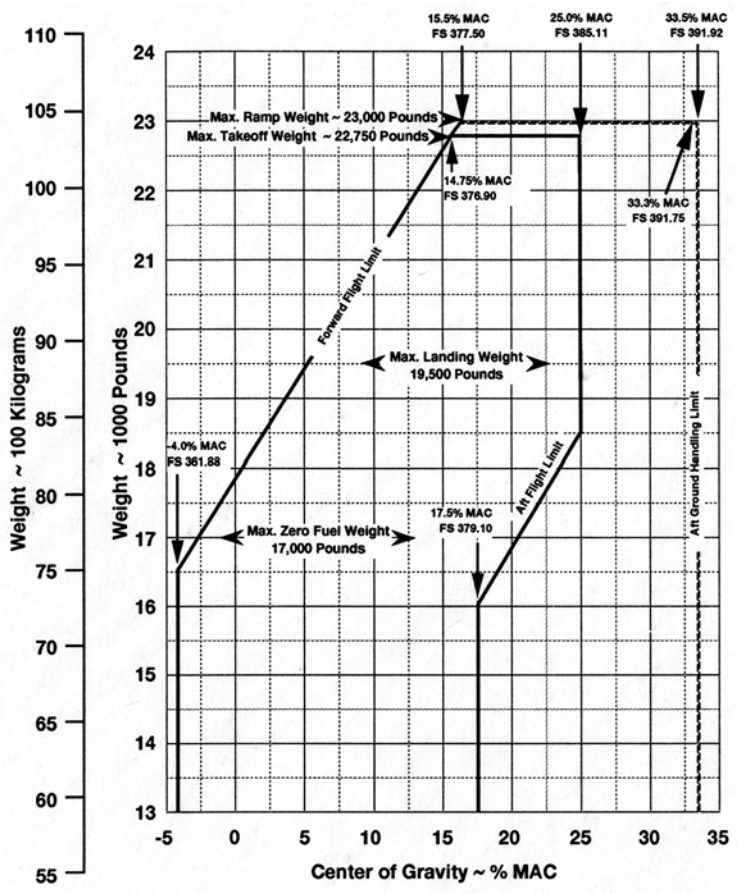
Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 22,750 pounds (10,319 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 22,750 pounds (10,319 kg) and tapers to F.S. 378.70 (17.0% MAC) at 23,000 pounds (10,433 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 391.75 (33.3% MAC) at 23,000 pounds (10,433 kg).

Figure 1-1

CENTER-OF-GRAVITY ENVELOPE

Standard 22,750 LB (10,319 Kg) Takeoff Weight
60-049 & Subsequent



Forward Flight Limit — F.S.361.88 (-4.0% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 376.90 (14.75% MAC) at 22,750 pounds (10,319 kg).

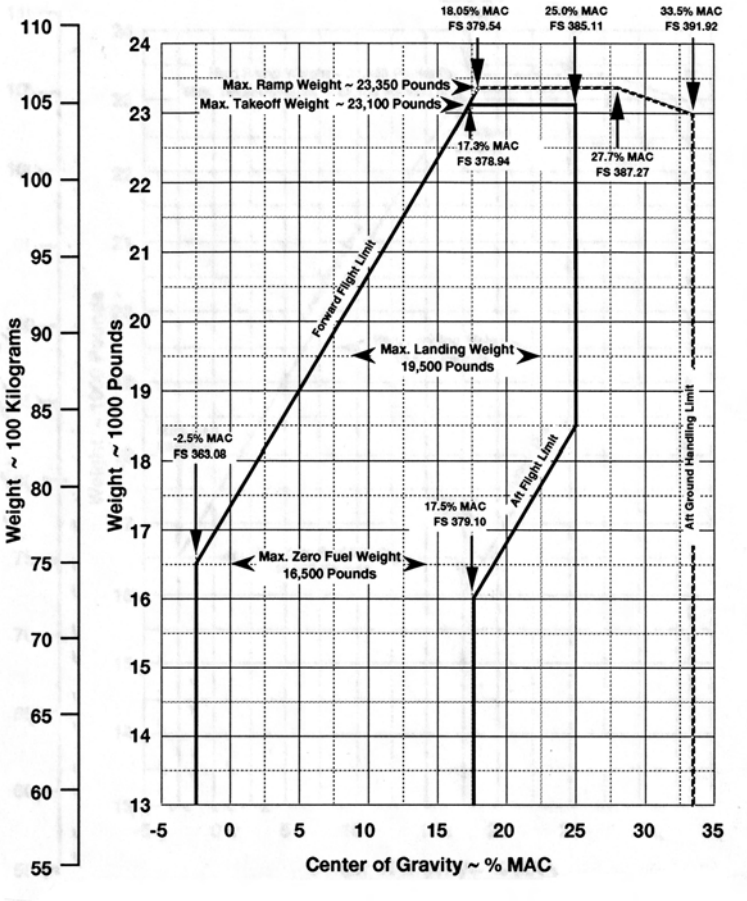
Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 22,750 pounds (10,319 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 22,750 pounds (10,319 kg) and tapers to F.S. 377.50 (15.5% MAC) at 23,000 pounds (10,433 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 391.75 (33.3% MAC) at 23,000 pounds (10,433 kg).

Figure 1-2

CENTER-OF-GRAVITY ENVELOPE

Optional 23,100 LB (10,478 Kg) Takeoff Weight



Forward Flight Limit — F.S. 363.08 (-2.5% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.94 (17.3% MAC) at 23,100 pounds (10,478 kg).

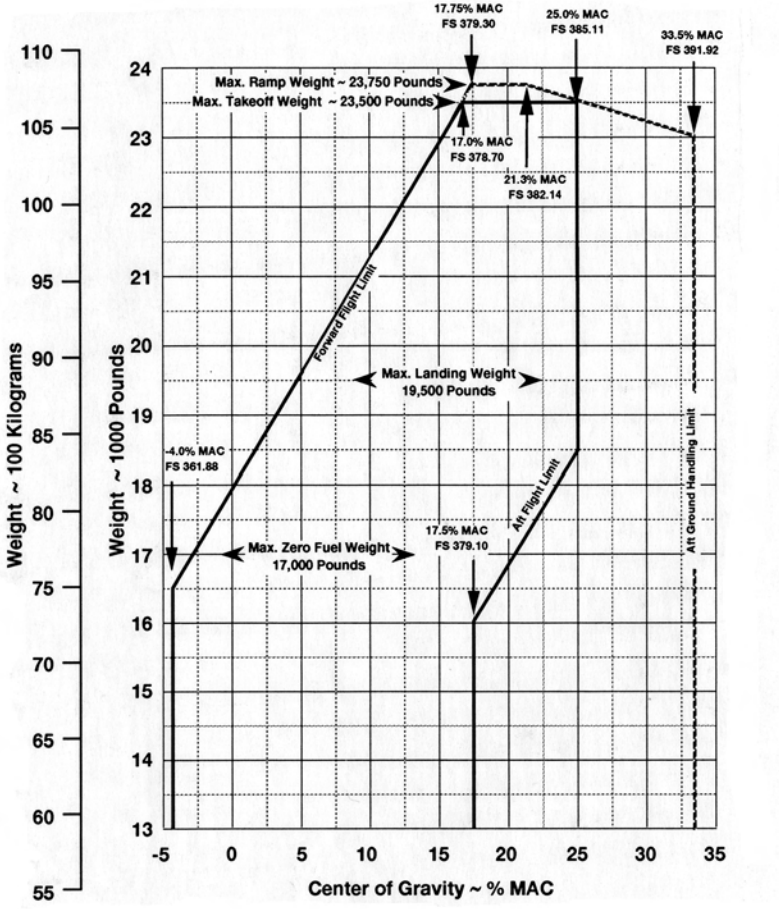
Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 23,100 pounds (10,478 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 23,100 pounds (10,478 kg) and tapers to F.S. 379.54 (18.05% MAC) at 23,350 pounds (10,592 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 387.27 (27.7% MAC) at 23,350 pounds (10,592 kg).

Figure 1-3

CENTER-OF-GRAVITY ENVELOPE

Optional 23,500 LB (10,660 Kg) Takeoff Weight



Forward Flight Limit — F.S. 361.88 (-4.0% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.70 (17.0% MAC) at 23,500 pounds (10,660 kg).

Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 23,500 pounds (10,660 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 23,500 pounds (10,660 kg) and tapers to F.S. 379.30 (17.75% MAC) at 23,750 pounds (10,773 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 382.14 (21.3% MAC) at 23,750 pounds (10,773 kg).

Figure 1-4

AIRSPEED/MACH LIMITS
PRIMARY PITOT-STATIC SYSTEM

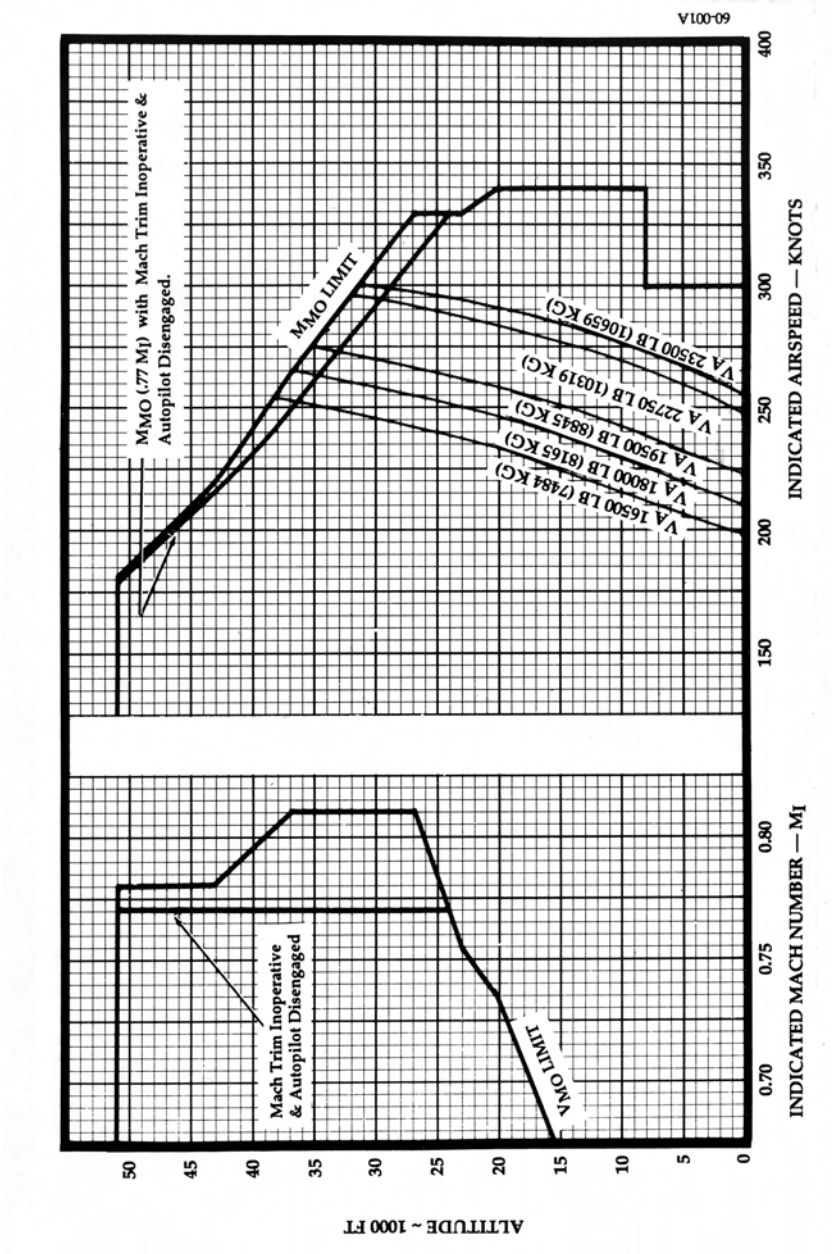


Figure 1-5

AIRSPEED/MACH LIMITS

NOTE

All Airspeed/Mach Limits are expressed in terms of indicated values unless otherwise stated. Instrument error is assumed to be zero.

MAXIMUM OPERATING SPEED VMO/MMO

WARNING

Do not extend spoilers, or operate with spoilers deployed, at speeds above VMO/MMO due to significant nose-down pitching moment associated with spoiler deployment.

VMO/MMO shall not be deliberately exceeded in any regime of flight (climb, cruise or descent) unless a higher speed is authorized for flight test.

Primary Instruments

VMO

- Up to 8,000 feet ..... 300 KIAS
- 8,000 to 20,000 feet ..... 340 KIAS
- 20,000 to 23,000 feet ..... 340 to 330 KIAS
- 23,000 to 26,750 feet ..... 330 KIAS

MMO

- 26,750 to 37,000 feet ..... 0.81 MI
- 37,000 to 43,000 feet ..... 0.81 to 0.78 MI
- 43,000 feet and above ..... 0.78 MI
- With Mach Trim inoperative and Autopilot disengaged ..... 0.77 MI

Standby Instruments

VMO

- Up to 8,000 feet ..... 295 KIAS
- 8000 to 26,750 feet ..... 323 KIAS

MMO

- 26,750 feet and above ..... 0.75 MI

EFFECTIVITY
Aircraft 60-001 thru 60-248

AIRSPEED/MACH LIMITS (Cont)

NOTE

The MMO limits expressed above are based upon compressibility effects. Refer to **Overspeed Recovery — Overspeed Horn Sounds** procedure in Section III — EMERGENCY PROCEDURES.

Refer to figure 1-5, entitled **AIRSPEED/MACH LIMITS** — Primary Pitot-Static System, this section.

MANEUVERING SPEED VA

CAUTION

Avoid rapid and large alternating control inputs, especially in combinations with large changes in pitch, roll or yaw, as they may cause structural failure at any speed, including below VA.

Refer to figure 1-5 entitled **AIRSPEED/MACH LIMITS** — Primary Pitot-Static System, this section, for VA. Maneuvers involving full application of rudder and aileron controls, as well as maneuvers that involve angles of attack near stall should be confined to speeds below VA.

MAXIMUM LANDING GEAR OPERATING SPEED VLO

VLO is the maximum speed at which the landing gear can be safely extended or retracted.

- VLO ..... 200 KIAS

MAXIMUM LANDING GEAR EXTENDED SPEED VLE

VLE is the maximum speed at which the aircraft can be safely flown with the landing gear extended.

- VLE ..... 260 KIAS

MAXIMUM FLAP EXTENDED SPEED VFE

VFE is the maximum speed permissible with the wing flaps in a prescribed extended position.

VFE

- Flaps 8° ..... 250 KIAS
- Flaps 20° ..... 200 KIAS
- Flaps 40° ..... 165 KIAS

AIRSPEED/MACH LIMITS

NOTE

All Airspeed/Mach Limits are expressed in terms of indicated values unless otherwise stated. Instrument error is assumed to be zero.

MAXIMUM OPERATING SPEED VMO/MMO

WARNING

Do not extend spoilers, or operate with spoilers deployed, at speeds above VMO/MMO due to significant nose-down pitching moment associated with spoiler deployment.

VMO/MMO shall not be deliberately exceeded in any regime of flight (climb, cruise or descent) unless a higher speed is authorized for flight test.

Primary Instruments

VMO

- Up to 8,000 feet ..... 300 KIAS
- 8,000 to 20,000 feet ..... 340 KIAS
- 20,000 to 23,000 feet ..... 340 to 330 KIAS
- 23,000 to 26,750 feet ..... 330 KIAS

MMO

- 26,750 to 37,000 feet ..... 0.81 MI
- 37,000 to 43,000 feet ..... 0.81 to 0.78 MI
- 43,000 feet and above ..... 0.78 MI
- With Mach Trim inoperative and Autopilot disengaged ..... 0.77 MI

Standby Instruments

VMO

- Up to 8,000 feet ..... 298 KIAS
- 8000 to 20,000 feet ..... 338 KIAS
- 20,000 to 23,000 feet ..... 338 to 329 KIAS
- 23,000 to 26,750 feet ..... 329 to 330 KIAS

MMO

- 26,750 to 37,000 feet ..... 0.81 MI
- 37,000 to 43,000 feet ..... 0.81 to 0.78 MI
- 43,000 feet and above ..... 0.78 MI
- With Mach Trim inoperative and Autopilot disengaged ..... 0.77 MI

EFFECTIVITY
Aircraft 60-249 & Subsequent

AIRSPEED/MACH LIMITS (Cont)

NOTE

The MMO limits expressed above are based upon compressibility effects. Refer to **Overspeed Recovery — Overspeed Horn Sounds** procedure in Section III — EMERGENCY PROCEDURES.

Refer to figure 1-5, entitled **AIRSPEED/MACH LIMITS** — Primary Pitot-Static System, this section.

MANEUVERING SPEED VA

CAUTION

Avoid rapid and large alternating control inputs, especially in combinations with large changes in pitch, roll or yaw, as they may cause structural failure at any speed, including below VA.

Refer to figure 1-5 entitled **AIRSPEED/MACH LIMITS** — Primary Pitot-Static System, this section, for VA. Maneuvers involving full application of rudder and aileron controls, as well as maneuvers that involve angles of attack near stall should be confined to speeds below VA.

MAXIMUM LANDING GEAR OPERATING SPEED VLO

VLO is the maximum speed at which the landing gear can be safely extended or retracted.

- VLO ..... 200 KIAS

MAXIMUM LANDING GEAR EXTENDED SPEED VLE

VLE is the maximum speed at which the aircraft can be safely flown with the landing gear extended.

- VLE ..... 260 KIAS

MAXIMUM FLAP EXTENDED SPEED VFE

VFE is the maximum speed permissible with the wing flaps in a prescribed extended position.

VFE

- Flaps 8° ..... 250 KIAS
- Flaps 20° ..... 200 KIAS
- Flaps 40° ..... 165 KIAS

AIRSPEED/MACH LIMITS (Cont)

MINIMUM CONTROL SPEED AIR V_{MCA}

V_{MCA} is a function of altitude and temperature. During flight tests, the aircraft was controllable down to stall speed. The speed shown is this minimum demonstrated speed corrected for maximum thrust effect with rudder boost on or off. Section V Performance Charts account for the appropriate values.

V_{MCA}

- Flaps 8° ..... 120 KIAS
- Flaps 20° ..... 110 KIAS

MINIMUM CONTROL SPEED GROUND V_{MCG}

V_{MCG} is a function of altitude and temperature. The speed shown is a maximum, which occurs at maximum thrust conditions. Section V Performance Charts account for the appropriate values.

V_{MCG}

- Rudder boost ON ..... 95 KIAS
- Rudder boost OFF ..... 116 KIAS

TAKEOFF DECISION SPEED V_1

Refer to applicable figure entitled **TAKEOFF SPEEDS** in Section V.

ROTATION SPEED V_R

Refer to applicable figure entitled **TAKEOFF SPEEDS** in Section V.

TAKEOFF SAFETY SPEED V_2

Refer to applicable figure entitled **TAKEOFF SPEEDS** in Section V.

OPERATIONAL LIMITS/REQUIREMENTS

TAKEOFF

Maximum Pressure Altitude
- *60-001 thru 60-048 not incorporating SB 60-21-3* ..... 8,000 feet
- *60-049 & Subsequent and prior aircraft incorporating SB 60-21-3* ..... 13,700 feet

Ambient Temperature ..... Refer to Figure 1-6
Tailwind Component ..... 10 knots
Runway Conditions
- Takeoff is limited to paved runways.
- Runway water/slush accumulation ..... 3/4 inch (19 mm)

Engine Sync ..... OFF
Trim ..... All axes set for takeoff (refer to Figure 2-2)
Fuel Load ..... Wings balanced within 200 pounds (91 kg)

The following must be checked and operational:
- Trim Systems
- Both ADC Systems
- Standby Attitude Indicator or Integrated Standby Indicator System (as applicable)
- Stall Warning System
- Autospoilers ❶
- Rudder Boost ❶

EN ROUTE

Maximum Pressure Altitude ..... 51,000 feet
Ambient Temperature ..... Refer to Figure 1-6
Fuel Load .....Wings balanced within 500 pounds (227 kg)

LANDING

Maximum Pressure Altitude
- *60-001 thru 60-048 not incorporating SB 60-21-3* 8,000 feet
- *60-049 & Subsequent and prior aircraft incorporating SB 60-21-3* ..... 13,700 feet

Ambient Temperature ..... Refer to Figure 1-6
Tailwind Component ..... 10 knots
Runway Conditions
- Landing is limited to paved runways.
- Runway water/slush accumulation ..... 3/4 inch (19 mm)

Pressurization ..... Cabin not pressurized
Engine Sync ..... OFF
Fuel Load ..... Wings balanced within 200 pounds (91 kg)

❶ Required only if system is to be armed.

OPERATIONAL LIMITS/REQUIREMENTS (Cont)

LIMIT MANEUVERING LOAD FACTORS

- Flaps Up ..... +3.0 g to - 1.0 g
- Flaps Down ..... +2.0 g to 0.0 g

NOTE

These acceleration values limit the bank angle in a level coordinated turn to 70° (flaps up) and 60° (flaps down). In addition, pullups and pushovers must be limited to these values.

MANEUVERS

No aerobatic maneuvers, including spins, are approved.

Intentional stalls are prohibited above 18,000 feet with flaps and/or landing gear extended.

TURN-AROUND LIMITS

If the turn-around weight limit for brake energy, as determined from the applicable **LANDING WEIGHT LIMIT** chart in Section V, is exceeded during a landing or a rejected takeoff, the following limitations must be observed:

- The aircraft must be parked for a minimum waiting period of 20 minutes before the next takeoff attempt can be made.
- After the waiting period is observed, a visual inspection of the main-gear tires, wheels, and brakes for condition must be made.

SEAT BELTS AND SHOULDER HARNESSES

Seat belts and shoulder harnesses must be worn during takeoff and landing.

AMBIENT TEMPERATURE LIMITS

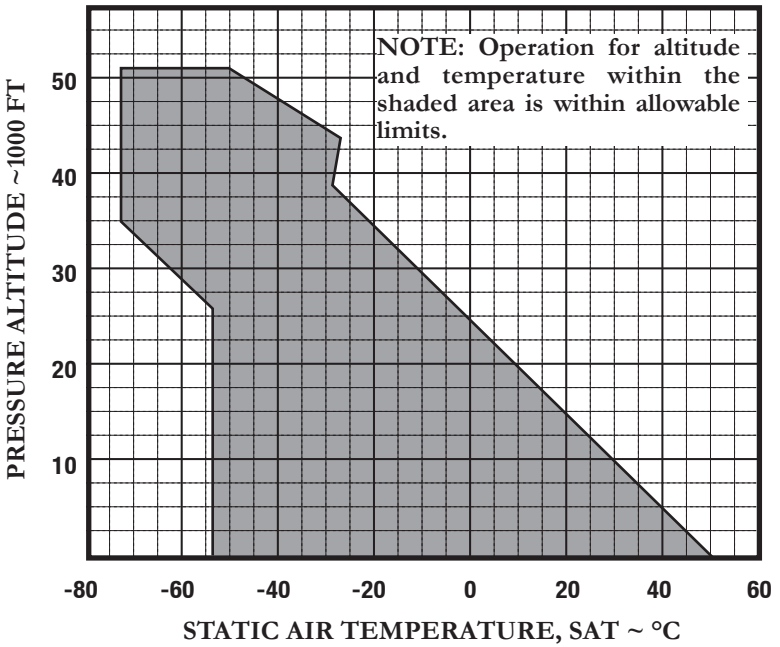


Figure 1-6

ANTI-ICE SYSTEM LIMITS

NACELLE HEAT

Nacelle heat must be On during ground or flight operations when icing conditions may exist. Refer to TYPE OF OPERATION limitations, this section.

Nacelle heat must be On during descent into visible moisture even if the SAT is below -40°C (-40°F).

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions (either in flight or prior to taxi.)

Ground Operation:
Do not operate nacelle heat system for more than 5 seconds when the associated engine is not running.

Do not operate nacelle heat system for more than 30 seconds when static air temperature is above 15°C (59°F).

Except for takeoff, do not operate nacelle heat system when engine RPM is greater than 65% N_1.

WINDSHIELD ALCOHOL ANTI-ICE

Methyl alcohol (Methanol) per Federal Specification O-M-232, Grade A, is required.

The alcohol reservoir shall be refilled after each use.

AVIONICS SYSTEM LIMITS

AIR DATA SYSTEM

Both air data systems (ADC 1 and 2) must be operative and the onside system selected (i.e., ADC 1 for pilot's side and ADC 2 for copilot's side) for takeoff.

All air data flags on the PFDs must be retracted for takeoff.

To assure proper air data system operation the BEFORE STARTING ENGINES overspeed warning system check must be accomplished in accordance with Section II of this manual.

ATTITUDE HEADING REFERENCE SYSTEM (AHS)

The onside attitude heading system must be selected (i.e., AHS 1 for pilot's side and AHS 2 for copilot's side) and the comparator annunciators must be extinguished for takeoff.

AVIONICS SYSTEM LIMITS (Cont)

AUTOPILOT/FLIGHT DIRECTOR

The autopilot/flight director system is approved for category I ILS approaches.

When using autopilot, the pilot or copilot must be in their respective seat with their seat belt fastened.

Operation of the autopilot with the red TRIM fail light illuminated is prohibited.

Use of spoilers with autopilot engaged is limited as follows:

Aircraft Configuration	Use of Spoilers is:
60-001 thru 60-039	
without ECR 3629 or SB 60-22-1	prohibited
with ECR 3629 or SB 60-22-1	permitted
60-040 & Subsequent	permitted

Autopilot pitch and roll axes must not be used for takeoff and landing. Do not intentionally overpower the autopilot.

The minimum altitude for use of the autopilot is:
Approach Configuration 200 feet AGL
En route Configuration 1000 feet AGL

AVIONICS SYSTEM LIMITS (Cont)

ELECTRONIC FLIGHT INSTRUMENT SYSTEM (EFIS)

The appropriate Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide must be immediately available to the flight crew. The appropriate pilot's guide as follows:

Installed FMS	Collins Pilot's Guide No. 523-0777003-xxxxxx dated:
Dual UNS-1E	15 Jun 94 or later revision
Dual UNS-1C	15 Jun 94 or later revision
Dual UNS-1B	24 Sep 92 or later revision
Single Collins	24 Sep 92 or later revision
Dual Collins	2nd Edition with 10 Aug 93 or later revision

A minimum of 3 large flight displays must be operational for takeoff and the following conditions must be satisfied:

Each outboard PFD display must be operational.

At least one inboard display must be operational.

The standby attitude indicator must be operational for takeoff.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1B (Software Version 405/505)

APPROVAL STATUS

The dual UNS-1B flight management system with program version 405.X or version 505.X (X=any value 0 to 9) is approved for use in the Learjet 60.

The following advanced performance data base version is approved for use in the Learjet 60:

- A12521

The UNS-1B contains software which provides capability for worldwide point-to-point navigation, as well as SIDs, STARs, holding patterns and approaches. Lateral and vertical (descent only) steering is provided for en route, terminal and approach operation.

Provided the UNS-1B Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route domestic, terminal, and instrument approach (RNAV, VOR-DME, VOR) operation within the U.S. National Airspace System using the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.
- *On aircraft equipped with single or dual GPS-1200 sensor(s)*, operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic, and remote navigation, and as one of the two required sensors for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.
- *On aircraft **not** equipped with GPS-1200 sensor(s)*, operation using GPS as a sole sensor for VFR/IFR navigation is not approved.
- Operation in MNPS (Minimum Navigation Performance Specification) Airspace in accordance with the criteria of AC 91-49 and AC 120-33 provided a minimum of two FAA approved sensor systems are installed.

AVIONICS SYSTEM LIMITS (Cont)

- The dual UNS-1B with dual GPS-1200 sensors has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with either the Universal Avionics System's off-line RAIM prediction program, part number 10751 with SCN 11.1 or later FAA approved version or "Sure-Flight" Fault Detection and Exclusion (FDE) prediction software, part number 185-613970-102. This does not constitute an operational approval.
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC20-129.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

FMS SYSTEM LIMITS

1. The UNS-1B Operator's Manual, Report No. 2421sv405, or Report No. 2421sv505, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1B.
2. Prior to flight, the crew must verify that program version 405.X or 505.X (X=any value 0 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved Advanced Performance Data Base version is installed.
3. The UNS-1B Operator's Manual supplement, for the advanced performance data base (Report No. 2421LR60, or later applicable revision), must be available to the flight crew whenever performance data is obtained from the FMS(es).
4. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed data must be verified against the AFM prior to use.
5. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.

AVIONICS SYSTEM LIMITS (Cont)

6. IFR en route and terminal navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
7. The UNS-1B is approved for lateral and vertical coupled IFR GPS, NDB, RNAV, VOR-DME, and VOR approaches under the following conditions:
   a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, LOC, or BC approach is linked into the Flight Plan.
   b. The flight management system is programmed with data from current published instrument approach procedures.
   c. The flight management system position and altitude have been checked for accuracy by the pilot in the terminal area no later than the Final Approach Fix (FAF).
   d. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA), whichever is higher.
   e. For GPS and FMS NDB approaches, a GPS 1200 receiver must be installed. GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1B Jeppesen data base.
   f. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operable.
8. The UNS-1B is approved for FMS "VFR" approaches as a VFR pilot aid only.
9. When using the UNS-1B for navigation, additional equipment approved for the specific type of operation must be installed and operational.
10. During periods of dead reckoning, the UNS-1B shall not be used as the primary source of navigation.
11. Utilization of magnetic variation reference data is limited to between 73° North and 60° South.
12. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.

AVIONICS SYSTEM LIMITS (Cont)

13. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc.
14. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.
15. *On aircraft equipped with GPS-1200 sensor(s)*, if the "GPS INTEGRITY NOT AVAILABLE" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTEG" annunciation on the PFD.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1B (Software Version 402, 403 or 404)

APPROVAL STATUS

The dual UNS-1B flight management system with program version 402.X, 403.X or 404.X (X=any value 0 to 9) is approved for use in the Learjet 60.

The following advanced performance data base version is approved for use in the Learjet 60:

- A12521

The Flight Management System is not approved for IFR navigation with only the GPS sensor operable.

Provided the Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy requirements of:

NOTE

Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

- VFR/IFR en route oceanic, en route domestic, terminal, and instrument approach (VOR, VOR/DME, RNAV) operation within the U.S. National Airspace System, using the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.
- Operation in MNPS (Minimum Navigation Performance Specification) airspace in accordance with the criteria of AC 91-49 and AC 120-33 provided a minimum of two FAA approved sensor systems are installed.
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC20-129.

AVIONICS SYSTEM LIMITS (Cont)

FMS SYSTEM LIMITS

1. The UNS-1B Operator's Manual, Report No. 2421sv402, or Report No. 2421sv403, or Report No. 2421sv404, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1B.
2. Prior to flight, the crew must verify that program version 402.X, 403.X, or 404.X (X=any value 0 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved advanced performance data base version is installed.
3. The UNS-1B Operator's Manual supplement, for the advanced performance data base (Report No. 2421LR60, or later applicable revision), must be available to the flight crew whenever performance data is obtained from the FMS(es).
4. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed data must be verified against the AFM prior to use.
5. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
6. IFR en route and terminal navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
7. The UNS-1B is approved for lateral and vertical coupled IFR RNAV, VOR-DME, and VOR approaches under the following conditions:
   a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, LOC, or BC approach is linked into the Flight Plan.
   b. The flight management system is programmed with data from current published instrument approach procedures.
   c. The flight management system position and altitude have been checked for accuracy by the pilot in the terminal area no later than the final approach fix (FAF).
   d. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA) whichever is higher.

AVIONICS SYSTEM LIMITS (Cont)

8. The UNS-1B is approved for FMS "VFR" approaches as a VFR pilot aid only.
9. When using the UNS-1B for navigation, additional equipment required for the specific type of operation must be installed and operational.
10. During periods of dead reckoning, the UNS-1B shall not be used for navigation.
11. Utilization of magnetic variation reference data is limited to between the following latitudes:

Installed FMS	Latitude
Program Version 402	70° North and 60° South
Program Version 403 or higher	73° North and 60° South

12. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
13. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc or any other kind of arc (including holding patterns).
14. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual Collins

APPROVAL STATUS

The dual Collins AMS-850 flight management system with program version 613-5470-204 or program version 613-5470-207 is approved for use in the Learjet 60.

The Flight Management System contains software which provides capability for worldwide point-to-point navigation. Lateral steering is provided for en route and terminal operation. Vertical steering (climb and descent) is provided for en route operation.

On aircraft equipped with program version 613-5470-204, the Flight Management System is not approved for IFR navigation with only the GPS sensor operable.

Provided the Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy requirements of:

NOTE

- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.
- Satellite navigation data is based upon the use of only the Global Positioning System (GPS) operated by the United States.

- VFR/IFR en route domestic, terminal, and instrument approach (RNAV, VOR-DME, VOR) operation within the U.S. National Airspace System using the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.
- Operation in MNPS (Minimum Navigation Performance Specification) Airspace in accordance with the criteria of AC 91-49 and AC 120-33 provided a minimum of two FAA approved sensor systems are installed.

AVIONICS SYSTEM LIMITS (Cont)

- *When equipped with program version 613-5470-207 and CMA 764-2 GPS sensors,* operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, en route oceanic and remote navigation, and as one of the two required sensors for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A is approved.
- *When equipped with program version 613-5470-207 and Collins GPS 4000 GPS sensors,* operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal and en route oceanic navigation, and as one of the two required sensors for MNPS oceanic navigation is approved.
- *On aircraft **not** equipped with CMA 764-2 or Collins GPS 4000 GPS sensor(s)*, operation using GPS as a sole sensor for VFR/IFR navigation is **not** approved.
- VFR/IFR en route VNAV operation in accordance with the criteria of AC20-129.

FMS SYSTEM LIMITS

1. Prior to flight, the crew must verify that an approved program version has been installed.
2. IFR navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint and navaid for accuracy by reference to current approved data. The pilot shall verify that the installed data base is current prior to use.
3. The dual Collins FMS is approved for lateral coupled IFR RNAV, VOR-DME, and VOR approaches under the following conditions:
   a. The Flight Management System is in the FMS Approach mode.
   b. The Flight Management System is programmed with data from current published instrument approach procedures.
   c. The Flight Management System position has been checked for accuracy by the pilot in the terminal area no later than the final approach fix (FAF).
   d. RNAV approaches must be conducted with flight directors in APPR mode to enable expanded deviation scaling on the PFD.
   e. GPS based approaches are not approved.

AVIONICS SYSTEM LIMITS (Cont)

4. When using the Flight Management System for navigation, additional equipment required for the specific type of operation must be installed and operational.
5. During periods of dead reckoning, the Flight Management System shall not be used as the primary source of navigation.
6. Utilization of magnetic variation reference data is limited to between 70° North and 60° South latitudes.
7. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
8. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions.
9. SIDs and STARs are not included in the data base. If the FMS is to be programmed to execute a SID, the waypoints of the SID must be programmed prior to departure.
10. *On aircraft equipped with program version 613-5470-207 and CMA 764-2 or Collins GPS 4000 GPS sensor(s)*, if "GPS INTEGRITY NOT MONITORED" message is displayed on the CDU, continued navigation using either GPS equipment or an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR approved navigation system. This message will be accompanied by a yellow "GPS" annunciation on the PFD.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Single Collins

APPROVAL STATUS

The single Collins FMS-850 flight management system with program version 613-5470-027 is approved for use in the Learjet 60.

The Flight Management System contains software which provides capability for worldwide point-to-point navigation. Lateral steering is provided for en route and terminal operation.

The Flight Management System is not approved for IFR navigation with only the GPS sensor operable.

Provided the Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy requirements of:



Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

- VFR/IFR en route and terminal RNAV operation in accordance with the criteria of AC20-130. RNAV approaches are **not** approved.
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.

AVIONICS SYSTEM LIMITS (Cont)

FMS SYSTEM LIMITS

1. IFR navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint and navaid for accuracy by reference to current approved data.
2. When using the Flight Management System for navigation, additional equipment required for the specific type of operation must be installed and operational.
3. During periods of dead reckoning, the Flight Management System shall not be used as the primary source of navigation.
4. SIDs and STARs are not included in the data base. If the FMS is to be programmed to execute a SID, the waypoints of the SID must be programmed prior to departure.
5. Utilization of magnetic variation reference data is limited to between 70° North and 60° South latitudes.
6. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
7. Prior to flight, the crew must verify that an approved program version has been installed.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1C (Software Version 600/700)

APPROVAL STATUS

The dual UNS-1C flight management system with program version 600.X or version 700.X (X=any value 0 to 9) is approved for use in the Learjet 60.

The following airworthiness approvals do not constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

The following advanced performance data base version is approved for use in the Learjet 60:

- A12521

The UNS-1C contains software which provides capability for worldwide point-to-point navigation, as well as SIDs, STARs, holding patterns and approaches. Lateral and vertical (descent only) steering is provided for en route, terminal and approach operation.

Provided the UNS-1C Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route domestic, terminal, and instrument approach (RNAV, VOR-DME, VOR) operation within the U.S. National Airspace System using the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- Area Navigation (RNAV) Q and T Routes within the U.S. National Airspace system in accordance with the criteria of AC900-100A when receiving valid GPS inputs, and when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.
- Operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic and remote navigation, and as one of the two required sensors for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.

AVIONICS SYSTEM LIMITS (Cont)

- Operation in MNPS (Minimum Navigation Performance Specification) Airspace in accordance with the criteria of AC 91-49 and AC 120-33 provided a minimum of two FAA approved sensor systems are installed.
- The dual UNS-1C, each with an internal GPS sensor, has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with the UNS flight planning program (part number 10751.5 with SCN 25.1 or later FAA approved version).
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC20-129.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

FMS SYSTEM LIMITS

1. The FMS has **not** been demonstrated to be compliant with DME/DME RNAV per the requirements of Appendix 1 and Appendix 2 of AC 90-100A.
2. The FMS has **not** been demonstrated to be capable to fly RNAV 1 and RNAV 2 SIDs, STARs, and ODPs per the requirements of AC 90-100A.
3. The UNS-1C Operator's Manual, Report No. 2423sv600, or Report No. 2423sv700, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1C.
4. Prior to flight, the crew must verify that program version 600.X or 700.X (X=any value 0 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved Advanced Performance Data Base version is installed.
5. The UNS-1C Operator's Manual supplement, for the advanced performance data base (Report No. 2421LR60, or later applicable revision), must be available to the flight crew whenever performance data is obtained from the FMS(es).

AVIONICS SYSTEM LIMITS (Cont)

6. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed data must be verified against the AFM prior to use.
7. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
8. IFR approach navigation is prohibited unless the installed data base is current.
9. IFR en route and terminal navigation is prohibited unless the installed data base is current **or** the pilot verifies each selected waypoint for accuracy by reference to current approved data.
10. The UNS-1C is approved for lateral and vertical coupled IFR GPS, NDB, RNAV, VOR-DME and VOR approaches under the following conditions:
    a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, LOC, or BC approach is linked into the Flight Plan.
    b. The FMS data base is current.
    c. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA), whichever is higher.
    d. For GPS and FMS NDB approaches, GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1C Jeppesen data base.
    e. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operable.
11. The UNS-1C is approved for FMS “VFR” approaches as a VFR pilot aid only.
12. When using the UNS-1C for navigation, additional equipment approved for the specific type of operation must be installed and operational.
13. During periods of dead reckoning, the UNS-1C shall not be used as the primary source of navigation.

AVIONICS SYSTEM LIMITS (Cont)

14. Utilization of magnetic variation reference data is limited to between 73° North and 60° South.
15. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
16. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc or any other kind of arc (including holding patterns).
17. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.
18. If the "GPS INTEGRITY NOT AVAILABLE" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTEG" annunciation on the PFD.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1C (Software Version 601/701)

APPROVAL STATUS

The dual UNS-1C flight management system with program version 601.X or version 701.X (X=any value 2 to 9) is approved for use in the Learjet 60.

The following airworthiness approvals do **not** constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

The following advanced performance data base version is approved for use in the Learjet 60:

- A12521

The UNS-1C contains software which provides capability for worldwide point-to-point navigation, as well as high- and low-altitude airways, SIDs, STARs, holding patterns and approaches.

Provided the UNS-1C Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route domestic, terminal, and instrument approach (RNAV, VOR-DME, VOR, NDB-DME, NDB and TACAN) operation within the U.S. National Airspace System using the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- Area Navigation (RNAV 1 and RNAV 2) operations including Q and T Routes SIDs, STARs, and ODPs within the U.S. National Airspace System in accordance with the criteria of AC90-100A when receiving valid GPS inputs, and when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.
- Operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic and remote navigation, and as one of the two required sensors for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.

AVIONICS SYSTEM LIMITS (Cont)

- Operation in MNPS (Minimum Navigation Performance Specification) Airspace in accordance with the criteria of AC 91-49 and AC 120-33 provided a minimum of two FAA approved sensor systems are installed.
- The dual UNS-1C, each with an internal GPS sensor, has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC20-129.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

FMS SYSTEM LIMITS

1. The FMS has **not** been demonstrated to be compliant with DME/DME RNAV per the requirements of Appendix 1 and Appendix 2 of AC 90-100A.
2. The UNS-1C Operator's Manual, Report No. 2423sv601, or Report No. 2423sv701, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1C.
3. Prior to flight, the crew must verify that program version 601.X or 701.X (X=any value 2 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved Advanced Performance Data Base version is installed.
4. The UNS-1C Operator's Manual supplement, for the advanced performance data base (Report No. 2421LR60, or later applicable revision), must be available to the flight crew whenever performance data is obtained from the FMS(es).
5. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed data must be verified against the AFM prior to use.

AVIONICS SYSTEM LIMITS (Cont)

6. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
7. IFR approach navigation is prohibited unless the installed data base is current.
8. IFR en route and terminal navigation is prohibited unless the installed data base is current **or** the pilot verifies each selected waypoint for accuracy by reference to current approved data.
9. The UNS-1C is approved for lateral and vertical coupled IFR GPS, NDB-DME, NDB, RNAV, VOR-DME, VOR and TACAN approaches under the following conditions:
   a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, LOC, or BC approach is linked into the Flight Plan.
   b. The FMS data base is current.
   c. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA), whichever is higher.
   d. For GPS and FMS NDB approaches, GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1C Jeppesen data base.
   e. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operable.
10. The UNS-1C is approved for FMS "VFR" approaches as a VFR pilot aid only.
11. When using the UNS-1C for navigation, additional equipment approved for the specific type of operation must be installed and operational.
12. During periods of dead reckoning, the UNS-1C shall not be used as the primary source of navigation.
13. Utilization of magnetic variation reference data is limited to between 73° North and 60° South.
14. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.

AVIONICS SYSTEM LIMITS (Cont)

15. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc or any other kind of arc (including holding patterns).
16. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.
17. If the "GPS INTEGRITY NOT AVAILABLE" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTEG" annunciation on the PFD.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1C (Software Version 602/702)

APPROVAL STATUS

The dual UNS-1C flight management system with program version 602.X or versions 702.X (X=any value 2 to 9) is approved for use in the Learjet 60.

The following airworthiness approvals do **not** constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

The following advanced performance data base versions are approved for use in the Learjet 60:

- A12521 — (requires 602.2/702.2 or later program version).
- A12523 — (requires 602.4/702.4 or later program version).

The UNS-1C contains software which provides capability for worldwide point-to-point navigation, as well as high- and low-altitude airways, SIDs, STARs, holding patterns and approaches.

Provided the UNS-1C Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route domestic, terminal, and instrument approach (GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB and TACAN) operation within the U.S. National Airspace System using the NAD-83 or WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- Area Navigation (RNAV 1 and RNAV 2) operations including Q and T Routes, SIDs and STARs and ODPs within the U.S. National Airspace System in accordance with the criteria of AC 90-100A, when receiving valid GPS inputs, and when in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.

AVIONICS SYSTEM LIMITS (Cont)

- Operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic and remote navigation, and as the two required sensor systems for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.
- Operations requiring RNP-5 navigational accuracy.
- The dual UNS-1C, each with an internal GPS sensor, has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC20-129.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

FMS SYSTEM LIMITS

1. The FMS has **not** been demonstrated to be compliant with DME/DME RNAV per the requirements of Appendix 1 and Appendix 2 of AC 90-100A.
2. The UNS-1C Operator's Manual, Report No. 2423sv602, or Report No. 2423sv702, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1C.
3. Prior to flight, the crew must verify that program version 602.X or 702.X (X=any value 2 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved Advanced Performance Data Base version is installed.

AVIONICS SYSTEM LIMITS (Cont)

4. The applicable UNS-1C Operator's Manual supplement, for the advanced performance data base, must be available to the flight crew whenever performance data is obtained from the FMS(es):

Installed Performance Data Base	Applicable UNS-1C Performance Supplement
A12521	Report No. 2421LR60
A12523	Report No. 2421LR60-25

5. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed, takeoff field length, and takeoff N1 data must be verified against the AFM prior to use. Data base A12521 displays V speed data only.
6. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
7. The advanced performance data base wet runway required field length and/or allowable takeoff weight must be compared to the respective dry runway values. If the dry runway values are restrictive (longer distance/lighter weight), they must be used. The advanced performance data base wet runway V-speeds are applicable in either case.
8. IFR approach navigation is prohibited unless the installed data base is current.
9. IFR en route and terminal navigation is prohibited unless the installed data base is current **or** the pilot verifies each selected waypoint for accuracy by reference to current approved data.
10. The UNS-1C is approved for lateral and vertical coupled IFR GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB and TACAN approaches under the following conditions:
    a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, LOC, or BC approach is linked into the Flight Plan.
    b. The FMS data base is current.
    c. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA), whichever is higher.

AVIONICS SYSTEM LIMITS (Cont)

d. For GPS and FMS NDB approaches, GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1C Jeppesen data base.

e. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operable.

11. The UNS-1C is approved for FMS "VFR" approaches as a VFR pilot aid only.
12. When using the UNS-1C for navigation, additional equipment approved for the specific type of operation must be installed and operational.
13. During periods of dead reckoning, the UNS-1C shall not be used as the primary source of navigation.
14. Use of the UNS-1C for navigation is limited to latitudes between 73° North and 60° South unless magnetic variation is entered into the FMS manually.
15. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
16. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc or any other kind of arc (including holding patterns).
17. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.
18. If the "NO GPS INTEG" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTEG" annunciation on the PFD.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1C (Software Version 604/704)

APPROVAL STATUS

The dual UNS-1C flight management system with program version 604.X or version 704.X (X=any value 0 to 9) is approved for use in the Learjet 60.

The following airworthiness approvals do **not** constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

The following advanced performance data base versions are approved for use in the Learjet 60:

- A12521
- A12523

The UNS-1C contains software which provides capability for worldwide point-to-point navigation, as well as high- and low-altitude airways, SIDs, STARs, holding patterns and approaches.

Provided the UNS-1C Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route domestic, terminal, and instrument approach (GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB and TACAN) operation within the U.S. National Airspace System using the NAD-83 or WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- Area Navigation (RNAV 1 and RNAV 2) operations including Q and T Routes, SIDs and STARs and ODPs within the U.S. National Airspace System in accordance with the criteria of AC 90-100A, when receiving valid GPS inputs, and when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.

AVIONICS SYSTEM LIMITS (Cont)

- Operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic and remote navigation, and as the two required sensor systems for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.
- Operations requiring RNP-5 navigational accuracy.
- The dual UNS-1C, each with an internal GPS sensor, has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC20-129.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

FMS SYSTEM LIMITS

1. The FMS has **not** been demonstrated to be compliant with DME/DME RNAV per the requirements of Appendix 1 and Appendix 2 of AC 90-100A.
2. The UNS-1C Operator's Manual, Report No. 2423sv604, or Report No. 2423sv704, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1C.
3. Prior to flight, the crew must verify that program version 604.X or 704.X (X=any value 0 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved Advanced Performance Data Base version is installed.

AVIONICS SYSTEM LIMITS (Cont)

4. The applicable UNS-1C Operator's Manual supplement, for the advanced performance data base, must be available to the flight crew whenever performance data is obtained from the FMS(es):

Installed Performance Data Base	Applicable UNS-1C Performance Supplement
A12521	Report No. 2421LR60
A12523	Report No. 2421LR60-25

5. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed, takeoff field length, and takeoff N1 data must be verified against the AFM prior to use. Data base A12521 displays V speed data only.
6. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
7. The advanced performance data base wet runway required field length and/or allowable takeoff weight must be compared to the respective dry runway values. If the dry runway values are restrictive (longer distance/lighter weight), they must be used. The advanced performance data base wet runway V-speeds are applicable in either case.
8. IFR approach navigation is prohibited unless the installed data base is current.
9. IFR en route and terminal navigation is prohibited unless the installed data base is current or the pilot verifies each selected waypoint for accuracy by reference to current approved data.
10. The UNS-1C is approved for lateral and vertical coupled IFR GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB and TACAN approaches under the following conditions:
    a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, LOC, or BC approach is linked into the Flight Plan.
    b. The FMS data base is current.
    c. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA), whichever is higher.

AVIONICS SYSTEM LIMITS (Cont)

d. For GPS and FMS NDB approaches, GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1C Jeppesen data base.

e. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operable.

11. The UNS-1C is approved for FMS "VFR" approaches as a VFR pilot aid only.
12. When using the UNS-1C for navigation, additional equipment approved for the specific type of operation must be installed and operational.
13. During periods of dead reckoning, the UNS-1C shall not be used as the primary source of navigation.
14. Use of the UNS-1C for navigation is limited to latitudes between 73° North and 60° South unless magnetic variation is entered into the FMS manually.
15. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
16. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc or any other kind of arc (including holding patterns).
17. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.
18. If the "NO GPS INTEG" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTEG" annunciation on the PFD.

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AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM (FMS) - Dual UNS-1E (Software Version 801.X)

APPROVAL STATUS

The dual UNS-1E flight management system with program version 801.X (X=any value 4 to 9) is approved for use in the Learjet 60.

The following airworthiness approvals do **not** constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

The following advanced performance data base versions are approved for use in the Learjet 60:

- A12521
- A12523

The UNS-1E contains software which provides capability for world-wide point-to-point navigation, as well as high- and low-altitude airways, SIDs, STARs, holding patterns and approaches.

Provided the UNS-1E Flight Management System is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route domestic, terminal, and instrument approach (GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB, LOC and BC operation within the U.S. National Airspace System using the NAD-83 or WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- Area Navigation (RNAV 1 and RNAV 2) operations including Q and T Routes, SIDs and STARs and ODPs within the U.S. National Airspace System in accordance with the criteria of AC 90-100A, when receiving valid GPS inputs, and when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.

AVIONICS SYSTEM LIMITS (Cont)

- Operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic and remote navigation, and as the two required sensor systems for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.
- Operations requiring RNP-5 navigational accuracy.
- The dual UNS-1E, each with an internal GPS sensor, has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with the UNS flight planning program (part number 10751-5 with SCN 25.1 or later FAA approved version).
- VFR/IFR **en route, terminal, and approach** VNAV operation in accordance with the criteria of AC 20-129.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

FMS SYSTEM LIMITS

1. The FMS has **not** been demonstrated to be compliant with DME/DME RNAV per the requirements of Appendix 1 and Appendix 2 of AC 90-100A.
2. The UNS-1E Operator's Manual, Report No. 2423sv801.X, original issue (or later applicable revision) must be available to the flight crew whenever navigation is predicated upon the use of the UNS-1E.
3. Prior to flight, the crew must verify that program version 801.X (X=any value 4 to 9) has been installed. Prior to using the Advanced Performance function, the crew must verify that an approved Advanced Performance Data Base version is installed.

AVIONICS SYSTEM LIMITS (Cont)

4. The applicable UNS-1E Operator's Manual supplement, for the advanced performance data base, must be available to the flight crew whenever performance data is obtained from the FMS(es):

Installed Performance Data Base	Applicable UNS-1E Performance Supplement
A12521	Report No. 2421LR60
A12523	Report No. 2421LR60-25

5. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V speed, takeoff field length, and takeoff N1 data must be verified against the AFM prior to use. Data base A12521 displays V speed data only.
6. The FMS CDU will display V speeds in amber when Takeoff Field Length exceeds available runway length. An amber RWY SHORT will also be displayed. These amber V speeds are not approved for use.
7. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
8. The advanced performance data base wet runway required field length and/or allowable takeoff weight must be compared to the respective dry runway values. If the dry runway values are restrictive (longer distance/lighter weight), they must be used. The advanced performance data base wet runway V-speeds are applicable in either case.
9. IFR approach navigation is prohibited unless the installed data base is current.
10. IFR en route and terminal navigation is prohibited unless the installed data base is current or the pilot verifies each selected waypoint for accuracy by reference to current approved data.
11. The UNS-1E is approved for lateral and vertical coupled IFR GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB, LOC and BC approaches under the following conditions:
    a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS, approach is linked into the Flight Plan.
    b. The FMS data base is current.
    c. The minimum altitude for autopilot coupled VNAV operation is 400 feet AGL or Minimum Descent Altitude (MDA), whichever is higher.

AVIONICS SYSTEM LIMITS (Cont)

d. For GPS and FMS NDB approaches, GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1E Jeppesen data base.

e. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operable.

f. For LOC and BC approaches, the localizer frequency must be tuned prior to executing the approach.

12. The UNS-1E is approved for FMS "VFR" approaches as a VFR pilot aid only.
13. When using the UNS-1E for navigation, additional equipment approved for the specific type of operation must be installed and operational.
14. During periods of dead reckoning, the UNS-1E shall not be used as the primary source of navigation.
15. Use of the UNS-1E for navigation is limited to latitudes between 73° North and 60° South unless magnetic variation is entered into the FMS manually.
16. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gages for load and range planning.
17. The MFD map displays must not be used for pictorial situational awareness when a DME-arc procedure is the active TO leg. The EFIS cannot depict a DME arc or any other kind of arc (including holding patterns).

AVIONICS SYSTEM LIMITS (Cont)

18. When using VNAV, the altimeter must be used as the primary altitude reference. Observe all published altitude restrictions including MDA using the altimeter.
19. If the "NO GPS INTEG" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTEG" annunciation on the PFD.
20. For approach VNAV operations using Autopilot or Flight Director, the altitude selector (ASEL) must be used as the means of level-off and altitude hold prior to intercepting an approach VNAV path. Select ASEL prior to the final approach altitude for the VNAV approach intercept. After the altitude is captured, the altitude selector can be moved to MDA.

AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

AVIONICS SYSTEM LIMITS (Cont)

FLIGHT MANAGEMENT SYSTEM - Dual UNS-1E (Software Version 802.X)

APPROVAL STATUS

The UNS-1E flight management system with software version 802.X (X=any value 3 to 9) is approved for use in the Learjet 60.

The following airworthiness approvals do not constitute operational approval. Some types of operation require operational approval from the regulatory authorities.

The A12524 advanced performance data base is approved.

NOTE

- Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
- Use of the FMS is **not** limited to the geographic areas defined in the referenced advisory circulars. However, specific geographic limits stated within the context of this section do apply.

Lateral Navigation Approval

The dual UNS-1E installation with dual internal GPS sensors as installed has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, including MNPS, when used in conjunction with the UNS flight planning program (P/N 10751-5 with SCN 25.1 or later FAA approved version).

Provided the FMS is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

- VFR/IFR en route, terminal, and instrument approach (GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB, LOC, and BC) operation within the U.S. National Airspace System using the WGS-84 coordinate reference datum in accordance with the criteria of AC 20-130A.
- Area Navigation (RNAV 1 and RNAV 2) operations including Q and T Routes, SIDs, STARs, and ODPs within the U.S. National Airspace System in accordance with the criteria of AC 90-100A, when receiving valid GPS inputs, and when used in conjunction with the UNS flight planning program (P/N 10751-5 with SCN 25.1 or later FAA approved version).

AVIONICS SYSTEM LIMITS (Cont)

- B-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 2, Rev 1: AMJ 20X2 and JAA Temporary Guidance Material, Leaflet No. 3, Rev 1.
- P-RNAV operation within the European Airspace System in accordance with the criteria of JAA Temporary Guidance Material, Leaflet No. 10: Airworthiness and Operational Approval for Precision RNAV Operations in Designated European Airspace.
- The FMS is compliant with both TSO-C129A and TSO-C115B.
- The Jeppessen data base complies with the requirements for processing navigation data for use in UNS Flight Management Systems (SCN 802.x) under RTCA/DO-200A, Standards for Processing Aeronautical Data.
- Operation using GPS as a sole sensor for VFR/IFR en route domestic, terminal, approach (GPS, GPS overlay, NDB), en route oceanic and remote navigation, and as the two required sensor systems for MNPS oceanic navigation, and for use in updating self-contained navigation systems such as INS or Doppler worldwide in accordance with the criteria of AC 20-130A.
- Operations requiring RNP-5 or RNP-10 navigational accuracy.

Vertical Navigation Approval

The dual UNS-1E installation as installed meets the requirements for VFR/IFR en route, terminal and approach VNAV operation in accordance with the criteria of AC 20-129.

FMS SYSTEM LIMITS

1. The FMS has **not** been demonstrated to be compliant with DME/DME RNAV per the requirements of Appendix 1 and Appendix 2 of AC 90-100A.
2. The UNS-1E Operator's Manual, Report No. 2423sv802/902, with applicable supplements, must be available to the flight crew whenever navigation is predicated upon the use of the FMS.
3. Prior to flight, the crew must verify that program version 802.X (X=any value 3 to 9) has been installed. Prior to using the optional advanced performance function, the crew must verify that an approved advanced performance data base is installed.

AVIONICS SYSTEM LIMITS (Cont)

4. The UNS-1E Operator's Manual supplement, for the advanced performance data base (Report No. 2423LR60-802, or later applicable revision), must be available to the flight crew whenever performance data is obtained from the FMS(es).
5. All input data provided to the advanced performance data base must be verified for accuracy, and the resulting V-speed, takeoff field length, and takeoff N_1 data must be verified against the AFM prior to use.
6. The FMS CDU will display V-speeds in amber when Takeoff Field Length exceeds available runway length. An amber RWY SHORT will also be displayed. These amber V speeds are not approved for use.
7. The advanced performance data base may display a takeoff weight greater than the maximum allowable weight of 18,500 pounds (8391 kg) when operating with Anti-Skid — OFF, or when anti-skid protection for any wheel is inoperative. However, takeoff at any weight greater than 18,500 pounds (8391 kg) when anti-skid is off or inoperative is not approved.
8. The advanced performance data base wet runway required field length and/or allowable takeoff weight must be compared to the respective dry runway values. If the dry runway values are restrictive (longer distance/lighter weight), they must be used. The advanced performance data base wet runway V-speeds are applicable in either case.
9. IFR approach navigation is prohibited unless the pilot verifies the currency of the data base.
10. The FMS is not approved for precision instrument approaches.
11. IFR en route and terminal navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
12. The FMS is approved for coupled lateral and vertical IFR, GPS, RNAV, VOR-DME, VOR, NDB-DME, NDB, LOC, and BC approaches under the following conditions:
    a. The flight management system is in the FMS Approach mode. FMS approach mode will not arm or activate if an ILS approach is linked into the Flight Plan.

WARNING Use of VTO navigation during ILS approach operations is prohibited. This restriction also includes VTO navigation to an ILS Final Approach Fix.

AVIONICS SYSTEM LIMITS (Cont)

b. For GPS and NDB approaches, GPS integrity monitoring must be available with adequate integrity at the Final Approach Fix (FAF). GPS based approaches must be conducted using an approach from the UNS-1E Jeppesen data base.
c. The flight management system contains current Jeppesen data base cycle with approved instrument approach procedures.
d. The minimum altitude for autopilot coupled VNAV operation is 400 ft. AGL or Minimum Descent Altitude (MDA), whichever is higher.
e. When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS navigation. The aircraft must have operational equipment capable of using that navigation aid, and the required navigation aid must be operational.
f. For LOC and BC approaches, the localizer frequency must be tuned prior to executing the approach.

13. *For aircraft equipped with Universal FMS software versions SCN 802.0 to 802.4*, when flying approaches that have a course reversal in which the Holding Fix (HF) is co-located with the Final Approach Fix (FAF), *NO LINK* and *GAP* entries that appear prior to the FAF on the FPL page must be eliminated prior to 5 nm of the FAF or the FMS may lock up while sequencing the approach mode.
14. The FMS is approved for FMS "VFR" approaches as a VFR pilot aid only.
15. When using the FMS for navigation, additional equipment approved for the specific type of operation must be installed and operational. For operation within the European Airspace System, VOR or DME must also be available for use by the FMS.
16. During periods of dead reckoning (DR), the FMS shall not be used as the primary source of navigation except during oceanic/remote operations.
17. Use of the FMS for navigation is limited to latitudes between 73° North and 60° South unless magnetic variation is entered into the FMS manually.
18. Fuel display parameters are advisory only and do not replace primary fuel quantity or flow gauges for load and range planning.

AVIONICS SYSTEM LIMITS (Cont)

19. The Multi-Function Display (MFD) does not depict holding patterns, arcs or course reversals. The MFD must not be used for pictorial situational awareness during these operations.
20. When using VNAV, the altimeter display on each pilot's PFD must be used as the primary altitude reference for all operations. Observe all published altitude restrictions including MDA using the altimeter.
21. If the "NO GPS INTG" message is displayed, continued navigation using either the GPS equipment or reversion to an alternate means of navigation appropriate to the route and phase of flight is necessary. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR-approved navigation system. This message will be accompanied by a yellow "GPS INTG" annunciation on the PFD.
22. For approach VNAV operations using Autopilot or Flight Director, the altitude selector (ASEL) must be used as the means of level-off and altitude hold prior to intercepting an approach VNAV path. Select ASEL prior to the final approach altitude for the VNAV approach intercept. After the altitude is captured, the altitude selector can be moved to MDA.

AVIONICS SYSTEM LIMITS (Cont)

RUDDER BOOST SYSTEM

If the rudder boost system is to be used, the rudder boost system check must be accomplished in accordance with Section II of this manual.

ENGINE SYSTEM LIMITS

AUTOMATIC PERFORMANCE RESERVE (APR)

Manual selection of APR during a two-engine takeoff is limited to emergency conditions.

ENGINE TYPE

Pratt and Whitney Canada PW305A turbofan engines.

ENGINE COMPUTER

The engines must be operated at all times with the ENG CMPTR switches in the AUTO position, except as specified in EMERGENCY and ABNORMAL PROCEDURES in Section III and Section IV of this manual.

ENGINE SYSTEM LIMITS (Cont)

ENGINE OPERATING LIMITS

Operating Condition		Operating Limits				
Thrust Setting	**Time Limit Minutes**	**N_1 %**	**Max ITT °C**	**N_2 %**	**Oil Press psi ② ③**	**Oil Temp °C**
APR or T/O	5 ①	102	785	102	36 to 80	10 to 135
MCT or MCR	Continuous	102	785	102	36 to 80	10 to 135
Reverse Thrust	5	-	785	-	36 to 80	10 to 135
Ground Idle	Continuous	-	N/A	52	20 to 80	10 to 135
Flight Idle	Continuous	-	N/A	65	20 to 80	10 to 135
Starting		-	950 Fig 1-8A	-	20 to 220	-40 (minimum)
Transient	20 sec	104 Fig 1-7	825 Fig 1-8B	104 Fig 1-7	0 to 220	135 to 143
	90 sec	-	-	-	10 to 220	135 to 143

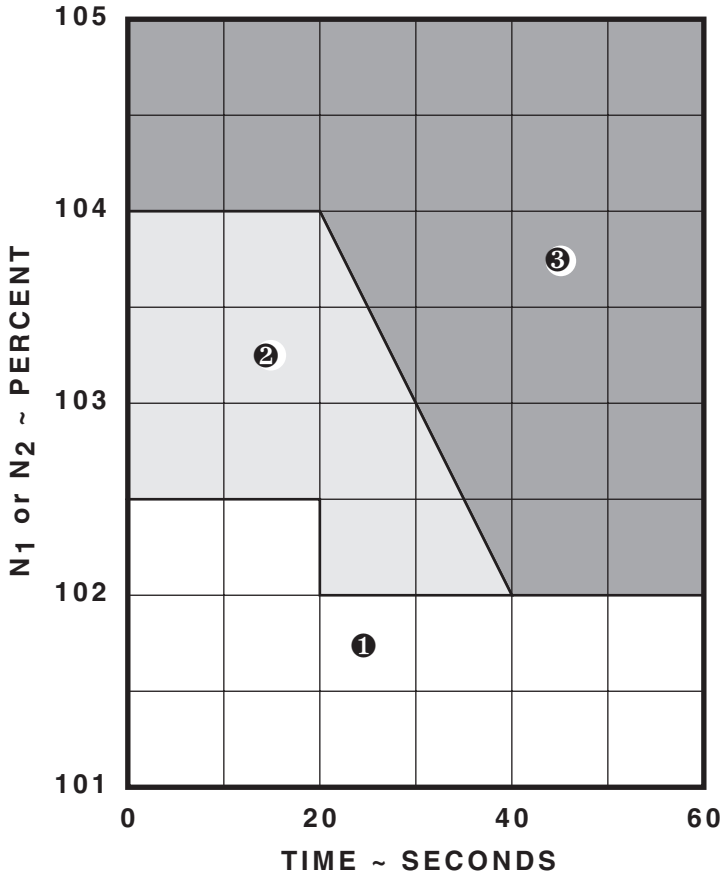
① Time limit commences when the power lever is first advanced to the T/O position.

② An oil pressure below 36 psi is undesirable and should be allowed for the completion of the flight, preferably at a reduced power setting to maintain the oil temperature within limits. Steady state operation with less than 20 psi could result in engine damage.

③ If engine windmills in flight for more than 15 minutes without a positive oil pressure indication, refer to the engine maintenance manual for required maintenance action.

ENGINE SYSTEM LIMITS (Cont)

ENGINE SPEED LIMITS



❶ No action required.
❷ Record in engine log.
❸ Refer to engine maintenance manual.

Figure 1-7

ENGINE SYSTEM LIMITS (Cont)

ENGINE TEMPERATURE LIMITS (ITT)

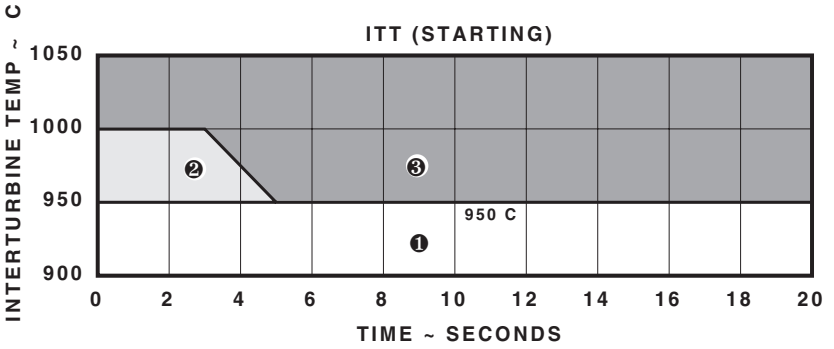


Figure 1-8A

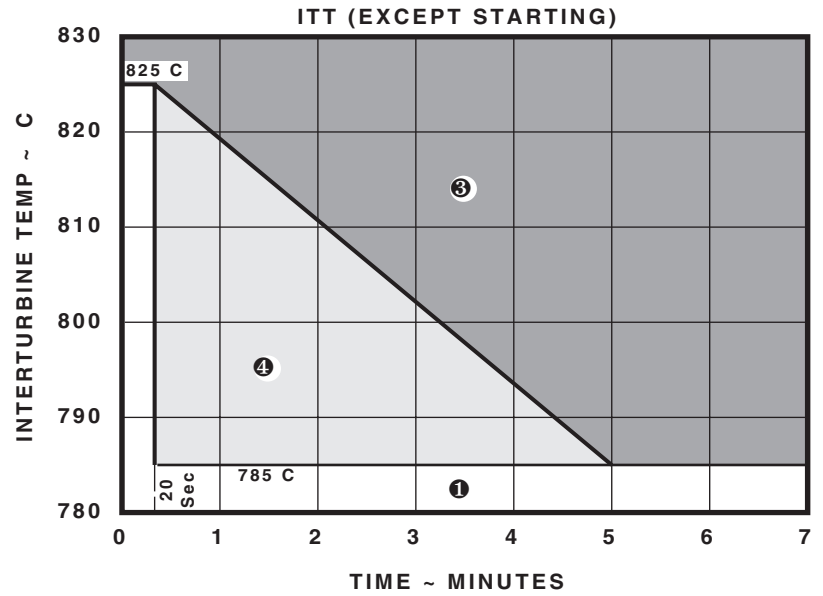


Figure 1-8B

❶ No action required.
❷ Determine cause and correct. Perform visual inspection. Record in engine log book.
❸ Refer to engine maintenance manual.
❹ Determine cause and correct. Perform hot section inspection. Record in engine log book.

ENGINE SYSTEM LIMITS

ENGINE SYNCHRONIZER

Engine sync must be OFF for takeoff, landing, and single-engine operation.

EXTERNAL POWER

The maximum amperage from an external power source must be limited to 1500 amps.

GENERATOR LIMITS

Generator output is limited as follows:

Ground Operations

- Continuous — 325 amps. The system may limit current output to below this value to prevent overheating. If more electrical load is applied than can be supplied by the generators, the current will be drawn from the aircraft batteries and will not be shown on the DC amps display. If this occurs, DC voltage will be reduced.
- Transient — Higher transient loads for cross-starts and battery charging, up to maximum generator output, are authorized.

Flight Operations

- Continuous
  - 400 amps up to 31,000 feet
  - 325 amps from 31,000 to 46,000 feet
  - 300 amps from 46,000 to 51,000 feet
- Transient — Higher transient loads for cross-starts and battery charging, up to maximum generator output, are authorized.



The electrical power monitor annunciates amber with loads above 325 amps and red with loads above 400 amps.

APPROVED OILS

Oils conforming to PWA521 and service bulletin SB24001 are approved. Refer to Addendum II — OIL SERVICING for a listing of approved oils.

ENGINE SYSTEM LIMITS (Cont)

STARTER LIMITS

The following cooling periods must be observed between consecutive uses of the starter during ground operations:

After Start Attempt	Wait
1	Three Minutes
2	Fifteen Minutes
3	Thirty Minutes

THRUST REVERSERS

Thrust reverser system use is limited to ground operations on paved surfaces and attempts to deploy shall not be made in flight.

Thrust reversers must not be used to back up the aircraft.

If successful completion of the thrust reverser operational check, per Section II of this manual has not been accomplished, the thrust reversers must be pinned per the Learjet 60 MAINTENANCE MANUAL prior to takeoff.

Thrust reverser circuit breakers must not be intentionally pulled while in flight, except as specified in Emergency and/or Abnormal Procedures.

Thrust reversers must not be used for touch-and-go landings.

Use of reverse thrust is limited as follows:

Aircraft Speed	Usable Reverse Thrust Range
Below 50 KIAS	Limited to Idle
50 KIAS & Above	From Idle to Maximum

ENVIRONMENTAL SYSTEM LIMITS

CABIN PRESSURIZATION

For takeoffs and landings above 8000 feet, the automatic pressurization mode must be used.

Do not land with the cabin pressurized.

- Maximum Differential Pressure ..... 9.8 PSI

COOLING SYSTEM

The cooling system must be OFF or the cabin temperature control must be in the manual mode with full cold selected for takeoff and landing.

OXYGEN SYSTEM

The following aircraft certification requirements are in addition to the requirements of applicable operating rules. The most restrictive requirements (certification or operating) must be observed.

Hats and "ear-muff" type headsets must be removed prior to donning crew oxygen masks.

NOTE

Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

Crew and passenger oxygen masks are not approved for use above 40,000 feet cabin altitude.

WARNING

- Passenger masks are intended for use during an emergency descent to an altitude not requiring supplemental oxygen.
- Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended.

FUEL SYSTEM LIMITS

NOTE

Prolonged operation at ambient temperatures below the freeze point of the fuel used may result in a reduction in usable fuel because of fuel freezing if proper fuel management procedures are not used. Refer to FUEL MANAGEMENT procedures in Section II - Normal Procedures.

FUEL LOAD/BALANCE

Do not takeoff or land with wing fuel unbalance greater than 200 pounds (91 kg).

During flight, wing fuel balance must be maintained within 500 pounds (227 kg).

APPROVED FUELS

The mixing of fuel types is allowed.

JP-5, JP-8, Jet A and Jet A-1 fuels conforming to Pratt and Whitney Canada CPW204 and Service Bulletin SB24004 are approved. Refer to Addendum I — FUEL SERVICING for a listing of approved fuels.

AVIATION GASOLINE

The use of aviation gasoline is prohibited.

FUEL ADDITIVES

ANTI-ICING ADDITIVE

Anti-icing additive is not a requirement. However, for microbial protection, it is recommended that fuel containing either an approved biocide additive or an anti-icing additive conforming to MIL-I-27686 be used at least once a week for aircraft in regular use and whenever a fueled aircraft will be out of service for a week or more.

BIOCIDE ADDITIVE

Biocide additive is not a requirement. However, Biobor JF is approved for use as a biocide additive when premixed in the fuel supply facility. Additive concentration is not to exceed 270 ppm. Refer to Addendum I — FUEL SERVICING for additional information.

HYDRAULIC SYSTEM LIMITS

Do not exceed auxiliary hydraulic pump duty cycle of 3 minutes ON, then 20 minutes OFF.

Only hydraulic fluid conforming to MIL-H-5606 is approved.

NOTE

When SAT is below -25°C (-13°F), engines must be operated 3 minutes prior to takeoff in order to bring the hydraulic system up to normal operating temperature.

LANDING GEAR AND BRAKING SYSTEM LIMITS

TIRES

Main Tire Limiting Speed (Ground Speed) ..... 182 knots

NOTE

The takeoff and landing speeds presented in this manual will not exceed this limit.

The nose and main tire pressures must be checked within 96 hours (not flight hours) prior to takeoff using the procedures listed in Chapter 12 of the Learjet 60 Maintenance Manual.

NOTE

- Aircraft parked for extended periods (10 or more consecutive days) will have tire pressure checked periodically in accordance with Chapter 12 of the Learjet 60 Maintenance Manual.
- The following table is provided for reference only.

AIRCRAFT WITH THE FOLLOWING MAXIMUM CERTIFIED TAKEOFF WEIGHT	ALLOWABLE TIRE PRESSURE RANGE	
All	Nose Gear	104 - 114 psig (718 - 785 kPa)
22,750 Pounds (10,319 kg) 23,100 Pounds (10,478 kg)	Main Gear	205 - 215 psig (1413 - 1481 kPa)
23,500 Pounds (10,660 kg)	Main Gear	209 - 219 psig (1441 - 1508 kPa)

SPOILER SYSTEM LIMITS

SPOILERS/AUTOSPOILERS/SPOILERONS

Spoilers:
If the spoilers are inoperative during flight, the maximum operating altitude is limited to 38,000 feet.

Do not extend spoilers with flaps extended while airborne.

Do not extend spoilers, or operate with spoilers deployed, at speeds above V_{MO}/M_{MO}.

Autospoilers:
If autospoilers are to be armed, the autospoiler check must be accomplished in accordance with Section II of this manual.

Do not arm autospoilers for takeoff if SPOILERON circuit breaker is open.

Do not arm autospoilers for training maneuvers where engine failure will be simulated above V_1 speed or for touch-and-go landings.

Spoilerons:
Spoilerons may be inoperative. If spoileron preflight check fails, the SPOILERON circuit breaker (R TRIM-FLT CONT group) must be pulled. Spoilers and spoilerons will be inoperative in flight; however, spoilers will function normally during ground operations.

STALL WARNING SYSTEM LIMITS

STALL WARNING SYSTEM

To assure proper stall warning system operation, the stall warning operation checks must be accomplished in accordance with Section II of this manual.

The angle-of-attack indicators and the approach and low-speed awareness cues may be used as a reference but do not replace the airspeed indicators as primary reference.

TRIM SYSTEM LIMITS

TRIM SYSTEMS

To assure proper trim systems operation, the trim systems checks must be accomplished in accordance with Section II of this manual.

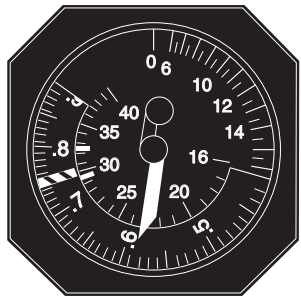
The complete TRIM SYSTEMS OPERATIONAL CHECK in Section II of this manual shall be successfully completed a minimum of once every 10 hours of airplane flight operation.

WARNING

Failure to conduct a pitch trim preflight check prior to each flight increases the probability of an undetected system failure. An additional single failure in the trim system could result in a trim runaway.

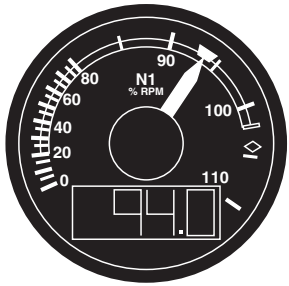
INSTRUMENT MARKINGS

STANDBY AIRSPEED/MACH INDICATOR *(Aircraft 60-001 thru 60-248 Only)*



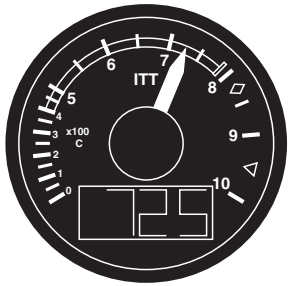
Red Lines ..... 295 and 323 KIAS
Barber Pole ..... 0.75 MI

N1



Green Arc ..... 20% to 102%
Red Line 102%
Red Diamond (Transient Limit) 104%

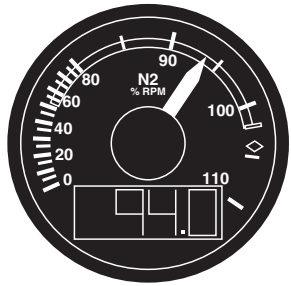
ITT



Green Arc ..... 400°C to 785°C
Red Line ..... 785°C
Red Diamond (Transient Limit) ..... 825°C
Red Triangle (Starting Limit) ..... 950°C
(Refer to Figure 1-8)

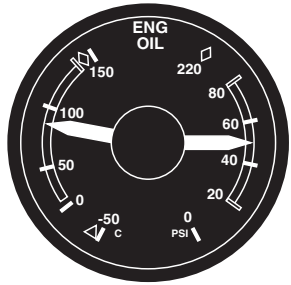
N2

Green Arc ..... 52% to 102%
Red Line 102%
Red Diamond (Transient Limit) 104%



OIL PRESSURE

Red Line (Min.) ..... 20 PSI
Yellow Arc ..... 20 to 36 PSI
Green Arc ..... 36 to 80 PSI
Red Line (Max.) ..... 80 PSI
Red Diamond (Transient Limit) .... 220 PSI



OIL TEMPERATURE

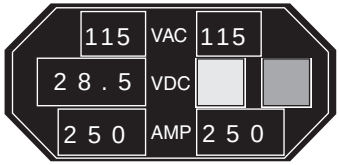
Red Triangle (min. for starting) ..... -40°C
Green Arc ..... 10°C to 135°C
Red Line ..... 135°C
Red Diamond (Transient Limit) ..... 143°C

PITCH TRIM

Takeoff Range ..... 5.7° to 8.75°



ELECTRIC POWER MONITOR



AC VOLTAGE

Normal Range ..... 110 to 130 VOLTS
Amber Light ..... 90 to 109 VOLTS
and 131 to 134 VOLTS
Red Light ..... Below 90 VOLTS
and Above 135 VOLTS

DC VOLTAGE

Normal Range ..... 22 to 29.5 VOLTS
Amber Light ..... 18 to 21.9 VOLTS
and 29.6 to 31.5 VOLTS
Red Light ..... Below 18 VOLTS
and Above 31.5 VOLTS

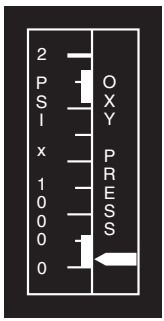
DC AMPERES

Normal Range ..... 0 to 325 AMPS
Amber Light ..... 326 to 400 AMPS
Red Light ..... Above 400 AMPS

Refer to **GENERATOR LIMITS**, this section.

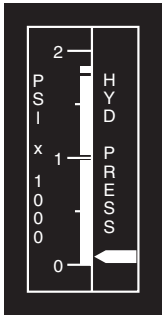
OXYGEN PRESSURE

Green Segment ..... 1550 to 1850 PSI
Yellow Segment ..... 0 to 300 PSI
Red Line ..... 2000 PSI



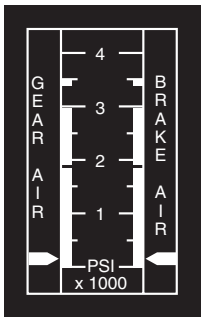
HYDRAULIC PRESSURE

Yellow Segment ..... 0 to 1000 PSI
Green Segment ..... 1000 to 1750 PSI
Red Line ..... 1750 PSI



GEAR AIR/BRAKE AIR

Yellow Segment ..... 0 to 1800 PSI
Green Segment ..... 1800 to 3000 PSI
Red Line ..... 3450 PSI



NOTE

If air bottles are serviced near the high end of yellow segment, (slightly above 1800 psi) pressure may drop during flight as the system cools; satisfactory gear extension and braking can still be expected.

SECTION II — NORMAL PROCEDURES
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Introduction

The procedures in this section of the manual have been developed by Learjet Inc. for the certification of this aircraft. This section contains those procedures which may be considered routine in day-to-day operations. The presentation includes, but is not limited to, detailed checklist procedures by flight phase. These normal procedures are provided as guidance and should not be construed as prohibiting the operator from developing equivalent normal procedures in accordance with the applicable operating rules.

Through Flight Procedures (Both Engines Shut Down)

Normal preflight procedures (all checklist line items) must be accomplished prior to takeoff at the original departure point of a flight. At each intermediate stop of flight where both engines are shutdown, the Through-Flight Checklist may be used for preflight provided certain criteria are met. In the following section, procedures marked with this symbol (◆) denote Through-Flight Checklist items. When permitted, accomplishment of all Through-Flight Checklist items fulfills a minimum preflight requirement.

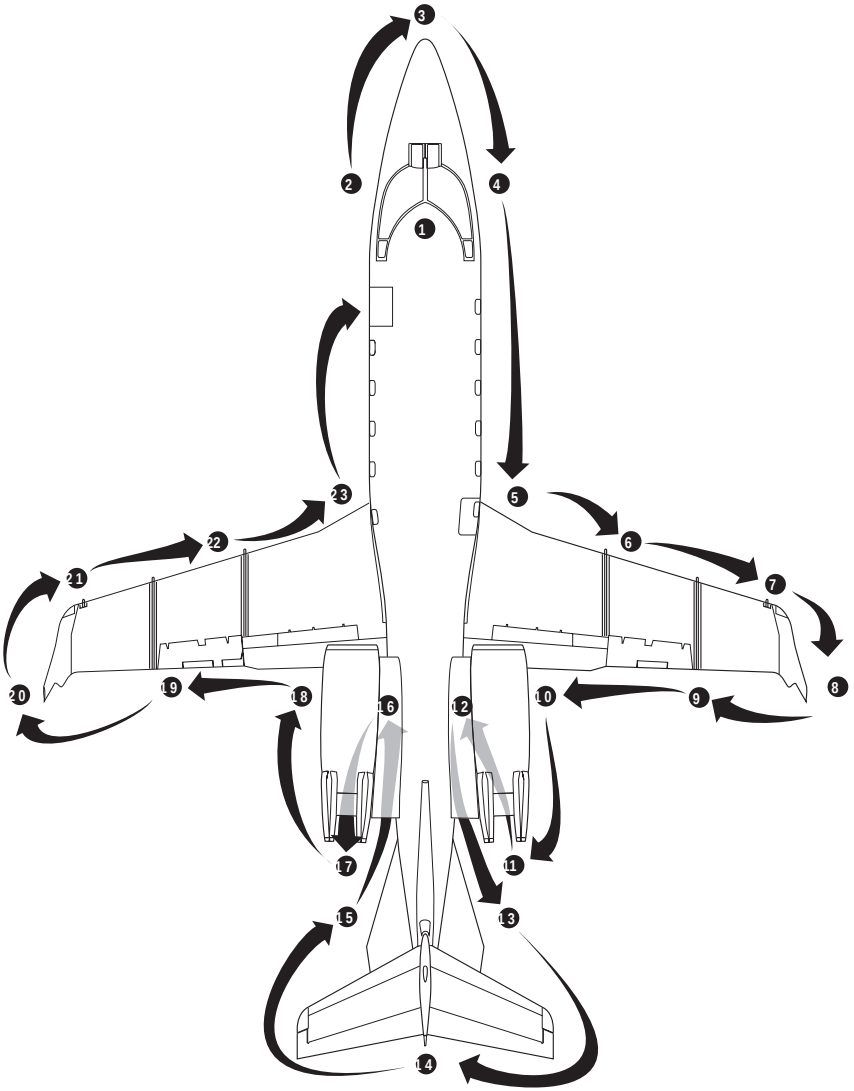
The Through-Flight Checklist may be used following an intermediate stop with both engines shutdown provided the following criteria have been satisfied during that stop:

- There has been no change in flight crew personnel.
- No maintenance has been performed on the aircraft. Routine line servicing is not considered maintenance.
- No more than three (3) hours have elapsed between engine shutdown and engine start.
- Extreme weather conditions (heavy precipitation, ice, snow, extreme cold, etc.) have not occurred which would change the preflight status of the aircraft.

WARNING **TURN-AROUND LIMITS** in Sections I and V of this manual must be observed.

For intermediate stops with one or no engine shut down, completion of the Quick Turn-Around procedure in this section provides the minimum preflight requirements.

Exterior Preflight



Walk-Around Inspection
Figure 2-1

Exterior Preflight (Cont)

Power Off Checks

◆ During Exterior Preflight, check all vents clear, check access doors for security, and all aircraft surfaces for condition.

1 ◆ a. Controls Lock — Remove and stow.

2 a. Pilot's Windshield Alcohol Discharge Outlets and Pilot's Defog Outlet — Clear of obstructions.

◆ b. Left Pitot-Static Probe — Cover removed, clear of obstructions.

◆ c. Left Stall Warning Vane — Freedom of movement, leave in down position.

d. Left Pitot-Static (2) Drain Valves — Drain. Required only if moisture in the pitot-static system is known or suspected.

NOTE

If pitot-static valves are opened, assure that valve stem returns to closed position.

e. Oxygen System Discharge Indicator *(if applicable)* — Condition.

f. Nose Compartment Doors — Secure.

g. Nose Gear and Wheel Well — Hydraulic leakage, condition, and cooling vents clear.

◆ h. Nose Wheel and Tire — Condition and nose gear uplock forward.

NOTE

Chine on nose tire must be a minimum of 3/4 inch (19 mm) from ground to operate safely with an accumulation of 3/4 inch (19 mm) water on runway surface.

i. Nosewheel Tire Pressure — Check (refer to Limitations Section).

3 a. Radome and Radome Erosion Shoe — Condition.

4 ◆ a. Right and Standby Pitot-Static Probes — Covers removed, clear of obstructions.

◆ b. Right Stall Warning Vane — Freedom of movement, leave in down position.

c. Pressurization Static Port — Clear of obstructions.

d. Right Pitot-Static Drain Valves (4) — Drain. Required only if moisture in the pitot-static system is known or suspected.

NOTE

If pitot-static valves are opened, assure that valve stem returns to closed position.

Exterior Preflight (Cont)

e. Total Temperature Probe — Condition.
f. Nose Compartment Doors — Secure.
g. Copilot's Windshield Defog Outlet — Clear of obstructions.
h. Wing Inspection Light and Lens — Condition.
i. Lower Fuselage Antennas, Beacon/Strobe Light and Lens — Condition.

5

a. Aft Cabin Door — Condition.
b. Upper Fuselage Antennas, and Dorsal Inlets — Condition.
◆ c. Fuselage Tank Access Door — Secure.
◆ d. Toilet Servicing Door — Secure.
◆ e. Right Engine Inlet and Fan — Clear of obstructions and condition.

WARNING

- If fan is windmilling, stop by pressing on fan spinner. Do not attempt to stop windmilling by grabbing blades.
- The wing, flight control surfaces, and engine inlet must be free of frost, snow, and ice.

f. Generator Cooling Scoop — Clear.
g. Fuel Crossover Drain Valve, Wing Scavenge Pump Drain Valves (2), Wing Sump Drain Valves (2), and Engine Fuel Drain Valves (2) — Drain.
h. Right Main Gear and Wheel Well — Hydraulic/fuel leakage and condition.
i. Right Main Gear Landing Light and Doors — Condition.
◆ j. Right Main Gear Wheels, Brakes and Tires — Condition.
k. Right Main Tire Pressure — Check (refer to Limitations Section).

6

a. Wing Stall Fences — Condition.
b. Leading Edge — Condition.
c. Inboard Fuel Vent Ram Airscoop (underside of wing) — Clear of obstructions.
d. Right Wing Access Panels (underside of wing) — Check for fuel leakage.

7

a. Outboard Fuel Vent Ram Airscoop (underside of wing) — Clear of obstructions. Outboard Vent Sump — Drain.
◆ b. Right Wing Fuel Filler Cap — Condition and security.
c. Right Winglet Navigation Light and Lens — Condition.

Exterior Preflight (Cont)

8
a. Right Winglet Static Discharge Wicks (4) — Condition.
b. Recognition and Beacon/Strobe Light and Lens — Condition.

9
a. Right Aileron — Check free motion, balance tab linkage and brush seal condition.
b. Boundary Layer Energizers — Condition.

10
a. Right Spoiler and Flap — Condition.
b. Right Engine Oil — Check oil level (normal).

NOTE

If preflight oil level checks low, start and run engine until stabilized at idle. Shut down engine and recheck oil level. If there is no oil level indication, add enough oil to obtain an indication before starting engine to recheck oil level.

11
◆ a. Right Engine Turbine Exhaust Area — Condition, clear of obstructions.
◆ b. Right Thrust Reverser — Condition and completely stowed.

12
◆ a. Single-point Fueling Access Doors — Secure.
b. Hydraulic Service Access Panel — Check hydraulic accumulator pressures (750 psi minimum for both).
c. Fuselage Tank Sump Drain Valve, Expansion Line Drain Valves (2), and Transfer Line Drain Valves (2) — Drain.
d. Fuel Filter Drain Valves (2) — Drain.
e. Fuselage Fuel Vent — Clear.
f. Single-point Fueling Pressure Vent Screen — Clear.
g. Battery Vents — Clear.

13
a. Right VOR/LOC Antenna — Condition.
b. ELT Antenna (if applicable) — Condition.

14
a. Vertical Stabilizer, Rudder, Horizontal Stabilizer, Elevator, and Delta Fins — Condition, drain holes clear.

WARNING

The vertical and horizontal stabilizer, and flight control surfaces must be free of frost, snow, and ice.

b. Static Discharge Wicks (6 on elevators, 1 above nav light, and 4 on delta fins) — Condition.
c. Vertical Fin Navigation Light and Lens — Condition.
◆ d. Tailstand — Removed.

Exterior Preflight (Cont)

15
- a. Oxygen System Discharge Indicator *(if applicable)* — Condition.
- b. Left VOR/LOC Antenna — Condition.
- c. HF Antenna — Condition.
- d. Tailcone Interior — Open access, check for fluid leaks, security and condition of installed equipment, main engine fire bottle pressures, then close access.
- ◆ e. Aft Baggage Compartment Door — Secure.

16
- a. Engine Fire Extinguisher Discharge Indicators — Condition.

17
- ◆ a. Left Engine Turbine Exhaust Area — Condition, clear of obstructions.
- ◆ b. Left Thrust Reverser — Condition and completely stowed.

18
- a. Left Engine Oil — Check oil level (normal).

NOTE

If preflight oil level checks low, start and run engine until stabilized at idle. Shut down engine and recheck oil level. If there is no oil level indication, add enough oil to obtain an indication before starting engine to recheck oil level.

- b. Left Spoiler and Flap — Condition.

19
- a. Left Aileron — Check free motion, balance and trim tab linkage and brush seal condition.
- b. Boundary Layer Energizers — Condition.

20
- a. Left Winglet Static Discharge Wicks (4) — Condition.

21
- a. Left Winglet Navigation Light and Lens — Condition.
- ◆ b. Left Wing Fuel Filler Cap — Condition and security.
- c. Outboard Fuel Vent Ram Airscoop (underside of wing) — Clear of obstructions. Outboard Vent Sump — Drain.

22
- a. Left Wing Access Panels (underside of wing) — Check for fuel leakage.
- b. Inboard Fuel Vent Ram Airscoop (underside of wing) — Clear of obstructions.
- c. Leading Edge — Condition.
- d. Wing Stall Fences — Condition.

Exterior Preflight (Cont)

23 a. Left Main Gear and Wheel Well — Hydraulic/fuel leakage and condition.
b. Left Main Gear Landing Light and Doors — Condition.
◆ c. Left Main Gear Wheels, Brakes and Tires — Condition.
d. Left Main Tire Pressure — Check (refer to Limitations Section)
◆ e. Left Engine Inlet and Fan — Clear of obstructions and condition.

WARNING

- If fan is windmilling, stop by pressing on fan spinner. Do not attempt to stop windmilling by grabbing blades.
- The wing, flight control surfaces, and engine inlet must be free of frost, snow, and ice.

f. Generator Cooling Scoop — Clear.

Power On Checks

1 LANDING GEAR Switch — DN.
Both BATTERY Switches — On.
Fuel Quantities — Check.
PITOT HEAT Switches — On.

2 4 Use caution when touching pitot-static mast leading edges and probes, pressurization static port, and stall warning vanes to check for heat. Set PITOT HEAT Switches OFF.

NOTE

The TAT probe heat is disabled on the ground by the squat switch relay. The heater may be checked on the ground by pulling the SQUAT SW circuit breaker (L TRIM-FLT CONT group) and setting the PITOT HEAT switches on.

5 7 If night flight is anticipated, check exterior lighting.
All Exterior Light Switches — On. Check proper illumination,
14 21 then all exterior light switches — Off.

1 Both BATTERY Switches — OFF.

Cabin Preflight

- 1. Baggage — Secure.
- 2. Aft Cabin Door — Closed and latched.
  - a. Handle — Aft.
  - b. Lock Pin (streamered) — Removed.
  - c. Lavatory Door — Open and access unobstructed.
- 3. Aisle — Clear.
- 4. Brief passengers. Briefing to include oxygen system operation, seat belt operation, life vest location & operation, fire extinguisher location, and emergency evacuation.

NOTE

- Passengers must be informed that smoking is prohibited in the lavatory.
- Passengers should be advised not to use portable electronic equipment during takeoff, approach and landing.

Before Starting Engines

◆ 1. Controls Lock — Stowed.
◆ 2. Safety Belts, Shoulder Harnesses, and Seats — Secure and adjust.

NOTE

Ensure that seat is adjusted so that full travel can be obtained on all controls.

◆ 3. Flight Controls — Check. Full travel on all controls.
◆ 4. Circuit Breaker Panels:
   a. Breakers — Set.
   b. BUS TIE Switches — OPEN (down).
   5. EMER BAT 1 and BAT 2 Switches — On. Check amber EMR PWR 1 and 2 lights illuminated, N1 indicators powered up, and (3) green DOWN lights illuminated.
◆ *For through-flight,* EMER BAT Switches — On.
◆ 6. Panel Switches and Avionics — Off or set:
   a. L INSTR LIGHTS — As required.
   b. Pilot's FREE-SLAVE Switch — SLAVE.
   c. STATIC SOURCE Switch — BOTH.
   d. RUDDER BOOST Switch — On as desired.
   e. EMER BUS Switch — NORMAL.
   f. ENG CMPTR Switches — AUTO.
   g. LANDING GEAR Switch — DN.
   h. ANTI-SKID Switch — On.
   i. L and R BLEED AIR Switches — ON.
   j. Copilot's FREE-SLAVE Switch — SLAVE.
   k. R INSTR LIGHTS — As required.
   7. Battery Check:

NOTE

Do not move the aircraft during AHS alignment. AHS alignment is indicated on the PFDs with the message "ATT/HDG ALIGNING DO NOT TAXI".

   a. BATTERY 1 Switch — Set to BATTERY 1. Check for proper voltage. Amber EMR PWR lights will extinguish.
   b. BATTERY 2 Switch — Set to BATTERY 2.
   c. BATTERY 1 Switch — OFF. Check for proper voltage, then BATTERY 1 Switch set to BATTERY 1.
◆ *For through-flight,* both BATTERY Switches — On.
◆ 8. GPU (if desired) — Connect.

NOTE

Ensure unit is regulated to 28 VDC and limited to 1500 amps maximum.

Before Starting Engines (Cont)

◆ 9. L and R INVERTER Switches — On. Check L and R VAC readings are within normal range.

NOTE

For normal operation, the left and right AC buses are separated (AC BUS TIE open).

10. Emergency Exit Lights (if installed):
◆ a. EMERGENCY EXIT LIGHTS Switch — ARMED.
b. TEST Switch — BAT 1. Check for illumination.
c. TEST Switch — BAT 2. Check for illumination.
◆ 11. Systems Pressure Checks:
a. HYD PRESS — Check. If pressure is below 1000 psi, HYD PUMP Switch — On.
b. GEAR AIR and BRAKE AIR Pressure — Check (1800 to 3000 psi).
◆ 12. PARKING BRAKE — Set. PARK BRAKE light illuminated.
13. EMER BRAKE — Pull the handle out of the recess then return. Do not push the handle downward, as it may introduce emergency brake air into the hydraulic system.
◆ 14. HYD PUMP Switch — OFF.
15. N_1, ITT, N_2, Fuel Flow, and Engine Oil Indicators — Check all are powered up.
16. Oxygen System:
a. PASSENGER OXYGEN Valve — AUTO.
◆ b. OXY PRESS Gauge(s) — Check.
c. Crew Oxygen Masks and Smoke Goggles — Check oxygen flow available. Masks and smoke goggles properly stowed.
◆ 17. Pressurization Controls — Set:
a. CAB AIR Switch — OFF.
b. LDG ALT Selector — Set landing field elevation of intended destination.
c. MAN ALT Control — Center.
d. MAN RATE Control — MIN.
e. Pressurization MODE — Automatic (MANUAL not illuminated).
f. EMER DEPRESS — Extinguished.
18. CABIN CLIMATE Controls — As Desired.
Automatic Mode Operation:
a. Crew AUTO-MAN Switch — AUTO.
b. Cabin AUTO-CABIN-MAN Switch — AUTO or CABIN.

Before Starting Engines (Cont)

NOTE

With switch in AUTO, the instrument panel mounted CABIN COLD-HOT knob will control the cabin temperature. With switch in CABIN, the remotely mounted temperature selector will control the cabin temperature.

c. COLD-HOT Knobs — Rotate to desired temperature. After takeoff, the cabin temperature control system will automatically maintain the cabin at the desired setting.

Manual Mode Operation:

a. AUTO-MAN Switches — MAN.
b. COLD-HOT Knobs — Rotate to desired setting.

19. Fuel System:
◆ a. Fuel Quantity — Check.
b. Standby Pumps — Check:
(1) Left STBY PUMP — ON. Check red L FUEL PRESS light extinguishes and FUEL SYS light illuminates.
(2) Left STBY PUMP — OFF.
(3) Right STBY PUMP — ON. Check red R FUEL PRESS light extinguishes and FUEL SYS light illuminates.
(4) Right STBY PUMP — OFF.
◆ c. Fuel Control Panel Indicator Lights and FUEL SYS Light — All lights extinguished except LO FUEL PRESS lights.

20. Pilot's or copilot's Lights Test Switch (glareshield) — Depress and check that all glareshield, instrument panel, and pedestal lights illuminate. After releasing the TEST switch, the following lights normally remain illuminated: L and R OIL PRESS, L and R FUEL PRESS, L and R HYDR PRESS, L and R GEN, CABIN AIR (if applicable), and PITOT HT. The following lights may be illuminated: T.O. TRIM, ENTRY DOOR, AFT CAB DOOR, and EXT DOORS.

◆ 21. Either Master WARN/CAUT Light — Depress and hold until Master CAUT light illuminates steady. This inhibits the master caution system.

22. Electrical Power — If GPU or APU are not available, start one engine. Refer to **Starting Engines** checklist, this section.

NOTE

Before starting one engine, perform Fire Detect System check per step 24d, below.

23. AVIONICS LEFT and RIGHT MASTER Switches — ON.

Before Starting Engines (Cont)

24. Warning System Checks:
    a. Windshield Ice Detect Lights (for night flight) — Check illuminated by placing an object between the lights and windshield, use care to prevent scratching windshield when checking Ice Detect Lights.
    b. Takeoff Warning System — Check horn. Advance right thrust lever to MCR detent and note that warning horn sounds. Return thrust lever to CUTOFF.
    c. Landing Gear Warning:
        (1) Check three (3) green DOWN lights illuminated.
        (2) SYSTEM TEST Switch — Rotate to GEAR. TEST Button — Depress and hold. Check horn sounds and amber MUTE and three (3) red UNSAFE lights illuminated.
        (3) TEST Button — Release.
    ◆ d. Fire Detect System:
        (1) SYSTEM TEST Switch — Rotate to FIRE DET.
        (2) TEST Button — Depress. ENG FIRE PULL shall illuminate and flash. This indicates continuity of the fire detect systems. ENG EXT ARMED shall illuminate. This indicates continuity through the two left and two right fire extinguisher squibs. Both BLEED AIR L and R lights shall illuminate. This indicates continuity through the tailcone bleed air overheat sensor system.
        (3) TEST Button — Release.
    e. Overspeed Warning:
        (1) SYSTEM TEST Switch — Rotate to OVSP.
        (2) TEST button — Depress and hold. The overspeed warning shall sound 3 times each separated by a brief pause. The third warning horn will continue until the TEST button is released.
        (3) TEST Button — Release.
    f. Cabin Altitude Warning:
        (1) SYSTEM TEST Switch — Rotate to CABIN ALT.
        (2) TEST Button — Depress and hold. Cabin altitude warning horn shall sound. *On aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2,* the CABIN ALT HI light will illuminate, and the Master WARN lights shall flash.
        (3) TEST Button — Release.

Before Starting Engines (Cont)

g. Stall Warning System:
   (1) SYSTEM TEST Switch — Rotate to L STALL.
   (2) TEST Button — Depress and hold. The pilot's angle-of-attack indicator needle will begin to sweep from the green segment to the red segment. As the needle passes the green-amber margin, the shaker will actuate, the Master WARN lights will illuminate, and the red L STALL light will flash and then become steady. Shaker actuation is made evident by high-frequency vibration of the control column.
   (3) TEST Button — Release.
   (4) Rotate SYSTEM TEST Switch to R STALL.
   (5) TEST Button — Depress and hold. The test operation will be identical to Step (2) above except needle will sweep the copilot's angle-of-attack indicator, and the red R STALL light will flash and then become steady.
   (6) TEST Button — Release.

NOTE

Except for system test, the stall warning shakers and lights are disabled on the ground. However, the angle-of-attack indicators will function normally.

h. Mach Trim:
   (1) SYSTEM TEST Switch — Rotate to MACH TRIM.
   (2) TEST Button — Depress and hold. The stabilizer should trim slowly in the nose up direction for 1 to 3 seconds and then stop. Trim-in-motion audio clicker may or may not sound. The amber MACH TRIM and PITCH TRIM lights will illuminate and the aural overspeed warning will sound.
   (3) TEST Button — Release. The MACH TRIM and PITCH TRIM lights will extinguish and the aural warning will cease.

i. Trim Speed Monitor:
   (1) Assure pitch trim is in N UP side of index point (►) on PITCH TRIM indicator (high trim rate/low airspeed range).
   (2) SYSTEM TEST Switch — Rotate to TRIM OVSP.
   (3) TEST Button — Depress and hold .
   (4) Either Control Wheel Trim Switch (arming button depressed) — Operate NOSE UP. Amber PITCH TRIM light shall illuminate.
   (5) TEST Button — Release.

Before Starting Engines (Cont)

25. Trim Checks:

NOTE

- Throughout the following procedure, verify that the trim-in-motion audio clicker sounds approximately 1 second after initiating pitch trim. The trim-in-motion audio clicker will not sound when the flaps are lowered beyond 3°.
- Trim rate with PITCH TRIM indicator pointer on N DN (high airspeed) side of index point is approximately one-fourth the trim rate with pointer on N UP (low airspeed) side of index point (►).
- The amber PITCH TRIM light on the glareshield will illuminate whenever either Control Wheel Master Switch (MSW) is depressed.

a. Flap Switch — UP.
b. PITCH TRIM Selector Switch (pedestal) — SEC.
   (1) NOSE DN-OFF-NOSE UP Switch (pedestal) — Operate NOSE UP and NOSE DN. Horizontal stabilizer trim movement shall occur in both directions.
   (2) Check that depressing pilot's Control Wheel Master Switch (MSW) while trimming NOSE UP and NOSE DN will stop trim motion while Control Wheel Master Switch (MSW) is held. Repeat using copilot's Control Wheel Master Switch (MSW).
   (3) Pilot's Control Wheel Trim Switch (arming button depressed) — Operate NOSE UP and NOSE DN. Trim motion shall not occur and amber PITCH TRIM light shall illuminate. Repeat using copilot's Control Wheel Trim Switch.

NOTE

Illumination of the amber PITCH TRIM light indicates that a pitch trim change has been commanded of the primary pitch trim system and the system cannot respond because secondary pitch trim is selected.

c. PITCH TRIM Selector Switch (pedestal) — OFF. Amber PITCH TRIM light will illuminate.

NOTE

Illumination of the amber PITCH TRIM light indicates that power is on the aircraft and the PITCH TRIM selector switch is in the OFF position.

Before Starting Engines (Cont)

(1) NOSE DN-OFF-NOSE UP Switch (pedestal) — Operate NOSE UP and NOSE DN. Trim motion shall not occur.

(2) Pilot's Control Wheel Trim Switch (arming button depressed) — Operate NOSE UP and NOSE DOWN. Trim motion shall not occur. Repeat using copilot's Control Wheel Trim Switch.

d. PITCH TRIM Selector Switch (pedestal) — PRI. Amber PITCH TRIM light shall extinguish.

e. Pilot's and copilot's Control Wheel Trim Switches — Check individually as follows:

◆ (1) Without depressing arming button, move switch NOSE UP and NOSE DOWN. Trim motion shall not occur.

(2) Without depressing arming button, move switch LWD and RWD. Trim motion shall not occur.

(3) Depress arming button. Trim motion shall not occur.

◆ (4) Depress arming button and move switch NOSE UP and NOSE DOWN. Trim motion shall occur in all directions.

(5) Depress arming button and move switch LWD and RWD. Trim motion shall occur.

◆ (6) Check that depressing pilot's Control Wheel Master Switch (MSW) while trimming NOSE UP, NOSE DOWN, LWD and RWD will stop trim motion.

f. Trim by positioning copilot's Control Wheel Trim Switch. While trimming, trim in opposite direction using pilot's Control Wheel Trim Switch. Pilot's trim shall override copilot's trim. Repeat for each trim position.

g. Trim Speed — Check as follows:

(1) Control Wheel Trim Switch — Trim as required to assure PITCH TRIM indicator pointer passes index point (►). Trim rate shall change as pointer passes the index point (►).

NOTE

Trim rate with PITCH TRIM indicator pointer on N DN (high airspeed) side of index point is approximately one-fourth the trim rate with pointer on N UP (low airspeed) side of index point (►).

(2) Control Wheel Trim Switch — Trim in opposite direction. Assure PITCH TRIM indicator pointer passes index point (►). Verify trim rate change.

Before Starting Engines (Cont)

◆ h. T.O. TRIM Light — Check as follows:
(1) Either Control Wheel Trim Switch — Operate as required to move PITCH TRIM indicator pointer through the entire T.O. segment.
(2) The amber T.O. TRIM light shall illuminate when the indicator pointer is slightly outside of the T.O. segment.
(3) The amber T.O. TRIM light shall extinguish whenever the indicator pointer is within the T.O. segment.

i. Pitch Trim Takeoff Configuration Warning — Check operation as follows:
(1) Flap Switch— 20° or 8°.
(2) PARKING BRAKE — Release.
(3) Control Wheel Trim Switch — Trim as required to assure PITCH TRIM indicator pointer is within the T.O. segment.
(4) Advance the right thrust lever to the MCR detent or beyond. No horn sounds when the PITCH TRIM indicator pointer is within the T.O. segment.
(5) Trim NOSE DOWN beyond the T.O. segment. Check that the T.O. TRIM light illuminates and the takeoff configuration warning horn sounds.
(6) Trim NOSE UP until the horn is silenced and the T.O. TRIM light extinguishes.
(7) Continue to trim NOSE UP beyond the T.O. segment. Check that the T.O. TRIM light illuminates and the takeoff configuration warning horn sounds.
(8) Trim NOSE DOWN until the horn is silenced and the T.O. TRIM light extinguishes.
(9) Right Thust Lever — CUTOFF.

j. Rudder Trim Switch (pedestal) — Check operation as follows:
(1) Move each half of switch separately to NOSE LEFT and NOSE RIGHT. Trim motion shall not occur.
(2) Move both halves of switch simultaneously to NOSE LEFT and NOSE RIGHT. Trim motion shall occur.
(3) Check that depressing pilot's Control Wheel Master Switch (MSW) while trimming will stop trim motion. Repeat step using copilot's Control Wheel Master Switch (MSW).

Before Starting Engines (Cont)

◆ k. Trim — Set all axes for takeoff and amber T.O. TRIM light extinguished. Refer to Figure 2-2 (Takeoff Trim Setting).

26. EFIS CONTROL Panels — Normal (no amber annunciations).
27. Avionics:
    a. FMS — Initialize.
    b. Flight Plan — Program.
    c. CVR — Test.
    d. Avionics — Set.
◆ 28. Uncage standby attitude indicator (if applicable). Check standby attitude indicator for starting and erection.
29. CABIN PWR Switch (if installed) — On.
30. Rudder Boost System Check (if applicable):
    a. RUDDER BOOST Switch — On.
    b. Flaps — 8° or lower.
    c. Depress rudder pedal. Green RB annunciator shall illuminate when rudder pedal force reaches approximately 50 pounds and extinguish when rudder pedal force is released.
    d. Repeat check using opposite rudder pedal.

	CENTER-OF-GRAVITY ~ % MAC						
	-4.0 to 6	8	12	16	20	23	25
T/O TRIM SETTING DEGREES	8.75	8.4	7.8	7.1	6.5	6.0	5.7

Takeoff Trim Setting
Figure 2-2

Starting Engines

Engine starts may be made using either a GPU or the airplane batteries. It is recommended that a GPU be used when ambient temperature is 32°F (0°C) or below. Ensure GPU supply is regulated to 28 VDC, has adequate capacity (at least 500 amps) for engine starting and is limited to 1500 amps maximum. Refer to **Cold Weather Operation**, this section for additional information when operating in extremely cold weather.

WARNING

Airflow into the PW 305 engine is sufficient to draw personnel and equipment into the engine inlet. Personnel in proximity of the engine inlet should maintain a safe distance at all times during engine operation.

CAUTION

On aircraft equipped with nickel-cadmium batteries, do not dispatch if red BAT 140 or BAT 160 warning light comes on at any time prior to takeoff, including engine start. Check batteries per Learjet Maintenance Manual.

◆ 1. Cabin Doors — Closed and latched.
   a. Both Cabin Entry Door Handles — Forward.
   b. Upper Cabin Door Lock Pawl — Retracted.
   c. Aft Cabin Door Handle — Aft.
   d. ENTRY DOOR, AFT CAB DOOR and EXT DOORS Lights — Out.

◆ 2. Pilot's Side Window (if openable type) — Closed and locked.

◆ 3. COOL Switch — OFF.

◆ 4. AUX HT Switch — OFF.

5. AVIONICS LEFT and RIGHT MASTER Switches — OFF.

◆ 6. Electric Power Monitor (AC & DC) — Check for minimum voltage.

NOTE

- *On aircraft with lead-acid batteries,* do not attempt a battery start with less than 24 VDC each battery at 70°F (21°C) or below, or less than 25 VDC each battery at 110°F (43°C) or above. Interpolate for temperatures between 70°F (21°C) and 110°F (43°C).
- *On aircraft with nickel-cadmium batteries,* do not attempt a battery start with less than 23 VDC each battery.

◆ 7. PARKING BRAKE (hydraulic pressure required) — Set.

8. HYD PUMP Switch — OFF.

◆ 9. BCN/STROBE Light Switch — BCN.

Starting Engines (Cont)

◆ 10. Thrust Levers — IDLE.

◆ 11. Engine — Start:

NOTE

Engine starting characteristics may be improved during battery only starts by leaving the thrust lever in CUTOFF until 10% N_2 is attained.

a. START-GEN Switch — START. Amber starter engaged light will illuminate.

b. Monitor the following:

(1) Fuel Flow and green IGNITION light at approximately 6% N_2.

CAUTION

Should the engine fail to light off within 10 seconds of achieving 5.2% N_2, move the thrust lever to CUT-OFF. Continue to motor the engine for an additional 15 seconds to clear trapped fuel or vapors. The N_2 rotor should be allowed to stop before attempting another start.

(2) N_1 — Increasing as N_2 increases.

CAUTION

If N_2 reaches 40% with no indication of N_1 rotation, abort start and refer problem to maintenance personnel.

(3) ITT — 950°C maximum.

(4) Oil Pressure — Indication.

c. At approximately 40% N_2, ignition will automatically turn off. IGNITION light — Out.

d. At approximately 45% N_2, starter will automatically disengage. Starter Engaged Light — Out. If starter engaged light remains illuminated, refer to **Starter Engaged Light Remains Illuminated After Start** procedure, Section IV.

NOTE

- If engine does not start, refer to **STARTER LIMITS** in Section I for the cooling period before attempting another start.
- If engine fails to start in three consecutive starting attempts, refer problem to maintenance personnel for fault isolation.

◆ 12. START-GEN Switch — GEN at idle. The generator will not come on line with a GPU connected.

Starting Engines (Cont)

13. Spoilerons — Check:
    a. Flap Switch — DN.
    b. SPOILER Lever — RET.
    c. Control Wheel — Center.
    d. SYSTEM TEST Switch — Rotate to SPOILER RESET.
    e. TEST Button — Depress. Rotate control wheel. SPOILER MON light shall illuminate. Release TEST button.
    f. Control Wheel — Center.
    g. TEST Button — Depress. SPOILER MON light will extinguish. Rotate control wheel in opposite direction. SPOILER MON light shall illuminate. Release TEST button.

NOTE

Control wheel movement to cause SPOILER MON light to illuminate shall be approximately the same in both directions.

    h. Control Wheel — Center.
    i. TEST Button — Depress and release. SPOILER MON light will extinguish.
    j. Control Wheel — Rotate left then right. Verify SPOILER MON light remains extinguished.
    k. Flaps — Set 20° or 8°.

◆ 14. ● **On aircraft 60-001 thru 60-093, except 60-079, *not* incorporating SB 60-27-6,** Spoiler/Autospoilers Check:

NOTE

This check may be accomplished with one or both engines operating.

    a. Thrust Levers — IDLE.
    b. SPOILER Lever — ARM. Check that spoiler indicator shows spoilers extend fully in approximately 1 to 2 seconds. SPOILER ARM and SPOILER EXT lights shall illuminate.
    c. SYSTEM TEST Switch — Rotate to SPOILER RESET.
    d. TEST Button — Depress. SPOILER MON light shall illuminate, spoilers shall slam down (retract within 1 second), SPOILER EXT light shall extinguish, and SPOILER ARM light shall remain illuminated.
    e. TEST Button — Release. SPOILER MON light shall extinguish, spoilers shall extend, SPOILER EXT light shall illuminate, and SPOILER ARM light shall remain illuminated.
    f. Left Thrust Lever — Advance above IDLE. Spoilers shall retract and SPOILER EXT light shall extinguish. SPOILER ARM light will remain illuminated.

Starting Engines (Cont)

g. Left Thrust Lever — IDLE. Spoilers shall extend and SPOILER EXT light shall illuminate.
h. Repeat steps f and g using right thrust lever.
i. SPOILER Lever — RET. Check that spoilers retract fully. SPOILER EXT light will extinguish.
j. Go to step 15.

◆ 14. ● **On aircraft 60-079, 60-094 & subsequent, and prior aircraft incorporating SB 60-27-6,** Spoiler/Autospoilers Check:

NOTE

This check may be accomplished with one or both engines operating.

a. Thrust Levers — IDLE.
b. SPOILER Lever — ARM. Check that spoiler indicator shows spoilers extend fully in approximately 1 to 2 seconds. SPOILER ARM and SPOILER EXT lights shall illuminate.
c. SYSTEM TEST Switch — Rotate to SPOILER RESET.
d. TEST Button — Depress. SPOILER MON light shall illuminate, spoilers shall slam down (retract within 1 second), SPOILER ARM and SPOILER EXT lights shall extinguish.
e. TEST Button — Release. SPOILER MON light shall extinguish, spoilers shall extend, SPOILER ARM and SPOILER EXT lights shall illuminate.
f. SPOILER Lever — RET. Spoilers shall retract. SPOILER ARM and SPOILER EXT lights will extinguish.
g. SPOILER Lever — ARM. Spoilers shall extend. SPOILER ARM and SPOILER EXT lights shall illuminate.
h. Thrust Levers — Advance above IDLE. Spoilers shall retract and SPOILER EXT light shall extinguish. SPOILER ARM light will remain illuminated.
i. Thrust Levers — IDLE. Spoilers shall remain retracted.
j. TEST Button — Depress and release. Spoilers shall extend and SPOILER EXT light shall illuminate.
k. Left Thrust Lever — Advance above IDLE. Spoilers shall retract and SPOILER EXT light shall extinguish. SPOILER ARM light will remain illuminated.
l. Left Thrust Lever — IDLE. Spoilers shall remain retracted.
m. Repeat steps j through l using right thrust lever.
n. Go to step 15.

◆ 15. Flaps — Set 20° or 8°.
◆ 16. HYD PRESS — Check (1500 to 1575 psi).
◆ 17. Electric Power Monitor (AC & DC) — Check.
◆ 18. Start other engine by repeating steps 11 and 12.

Starting Engines (Cont)

19. Fuel Control Panel and Quantity — Checked.
◆ 20. GPU (if applicable) — Disconnect. Note that both generators come on line.
◆ 21. Electric Power Monitor (AC & DC) — Check. GEN lights extinguished.

Before Taxi

◆ 1. Avionics:
   a. AVIONICS LEFT and RIGHT MASTER Switches — ON.
   b. FMS — Set.
   c. Takeoff Data (V_1, V_R, V_2, Takeoff Distance) — Computed and V-speeds set (refer to Section V).
   d. Avionics and Nav Equipment — Set for departure.
◆ 2. Circuit Breakers — Set.
◆ 3. Coffee/Oven Switches (if installed) — ON, if desired.
4. Anti-Ice Systems:
◆ a. WSHLD DEFOG — On, if desired.
◆ b. Purge windshield heat system of possible moisture accumulation (first flight of day and if exposed to moisture):
   (1) WSHLD HEAT Switch — On until water has cleared.
   (2) WSHLD HEAT Switch — As required.
   c. STAB WING HEAT Switch — On. Check STAB HEAT light illuminated, and DC amperes increase for 3 seconds then decrease. N_1 bugs may decrease.

CAUTION If STAB HEAT light does not illuminate and/or DC amperes do not decrease, immediately set STAB WING HEAT switch to OFF.

   d. STAB WING HEAT Switch — As required.
   e. PITOT HEAT Switches — On. Check PITOT HT light(s) extinguished.
   f. PITOT HEAT Switches — OFF.
   g. NAC HEAT Switches — ON one at a time. Check amber NAC HT lights extinguished, N_1 bugs drop, and green NAC HT ON light illuminated.
   h. NAC HEAT Switches — As required.

CAUTION To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to taxi if the OAT is 10°C (50°F) or below and visible moisture is present.

5. Emergency Pressurization Check:
   a. L BLEED AIR Switch — EMER. Check amber EMER PRESS light illuminates and emergency airflow activates.
   b. L BLEED AIR Switch — OFF. Check EMER PRESS light extinguishes and emergency airflow stops.
   c. L BLEED AIR Switch — ON.
   d. Repeat procedure using R BLEED AIR switch.
◆ 6. Engine Instruments and N_1 Bugs — Check; verify left and right bugs agree within 1%.

Before Taxi (Cont)

7. Flight Controls — Checked.
◆ 8. Cabin Check:
   a. Passengers Briefed.
   b. Swivel Seats — Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
   c. Work Tables and Toilet Doors — Check stowed.
   d. Aisle — Clear.
   e. Aft Cabin Door — Unobstructed.
◆ 9. NO SMOKING FASTEN SEAT BELT Switch — On.
◆ 10. Aircraft Lighting — ON, as required.

NOTE

Nav lights should be on for all night operations.

◆ 11. Nose Wheel Steering — ARM.

NOTE

- Nosewheel steering is armed by depressing the NOSE STEER Switch. The ARM and STEER ON lights will illuminate. Steering may be disengaged at any time by depressing and releasing the pilot's or copilot's Control Wheel Master Switch (MSW) or by depressing the NOSE STEER Switch.
- The PITCH TRIM light will illuminate whenever either Control Wheel Master Switch (MSW) is depressed.

◆ 12. L and R ANTI-SKID Lights — Extinguished.
◆ 13. PARKING BRAKE — Release. Check PARK BRAKE light extinguished.

Taxi and Before Takeoff

◆ 1. Brakes and Nose Wheel Steering — Check, and as required throughout taxi.

NOTE

When taxiing through slush or snow, use the brakes to create some friction heat in the brake discs to prevent brakes from freezing.

◆ 2. Flight Instruments — Check. Verify standby attitude indicator alignment.

NOTE

Heading splits which were caused by proximity to large metal objects may be cleared by cycling the HEADING FREE-SLAVE switch to FREE and then back to SLAVE while the aircraft is not turning or accelerating.

3. Thrust Reversers — Check operation:

CAUTION

- Use of reverse thrust on poorly cleaned or maintained runway, taxiway, or ramp surfaces may cause foreign object damage to engine fan blades.
- It is recommend that the aircraft be headed into the wind during thrust reverser ground operational check. Keep thrust reverser deployed time to a minimum to prevent foreign object damage.

NOTE

Should the thrust reversers fail to operate properly as indicated by the sequence of TR ARM, TR UNLOCK, and TR DEPLOY lights in the following check, both thrust reversers must be pinned per the Learjet 60 MAINTENANCE MANUAL or the malfunction corrected before flight.

a. Thrust Levers — IDLE. Green TR ARM lights shall be illuminated.
b. Thrust Levers — Advance slightly above IDLE. Green TR ARM lights shall extinguish.
c. Thrust Levers — IDLE. Green TR ARM lights shall illuminate and remain illuminated.
d. Thrust Reverser Levers — Lift to the DEPLOY detent. Check the following:
   - Amber TR UNLOCK lights shall illuminate as the thrust reversers deploy.
   - White TR DEPLOY lights shall illuminate and the amber TR UNLOCK lights shall extinguish when the thrust reversers are fully deployed.
   - N_1 bugs will reposition to approximately 50%.

Taxi and Before Takeoff (Cont)

e. Thrust Reverser Levers — Return to the STOW position. Check for the following:
- White TR DEPLOY lights shall extinguish.
- When fully stowed, amber TR UNLOCK lights will extinguish.
- N1 bugs will reposition to the takeoff thrust setting.

◆ 4. Radar — As required.

◆ 5. Spoilers — Armed/Retracted. Check SPOILER ARM light illuminated.

NOTE

On aircraft 60-001 thru 60-093, except 60-079 ***not*** *incorporating SB 60-27-6,* the SPOILER EXT light will be illuminated with the thrust levers at IDLE.

◆ 6. Flaps — Set 20° or 8°, check indication.

◆ 7. Trims — Set for takeoff.

◆ 8. CAB AIR Switch — ON, Check CABIN AIR light (if applicable) extinguishes.

◆ 9. CABIN CLIMATE Controls (inhibit system compressor cycling):

a. ●**If cooling system is *not* desired:**
(1) COOL Switch — OFF.

a. ●**If cooling system is desired:**
(1) COOL Switch — COOL.
(2) Cabin AUTO-MAN Switch — MAN.
(3) Cabin COLD-HOT Knob — COLD.

◆ 10. Crew Takeoff Briefing — Complete.

Runway Lineup

- 1. PARKING BRAKE — Released. Check PARK BRAKE light extinguished.
- 2. Transponder — On.
- 3. PITOT HEAT Switches — On. All PITOT HEAT lights extinguished.
- 4. Anti-Ice Systems:
  a. WSHLD HEAT Switch — As required.
  b. NAC HEAT Switches — As required.
  c. STAB WING HEAT Switch — As required.

WARNING

- The wings, vertical and horizontal stabilizers, flight control surfaces, and engine inlets must be free of frost, snow, and ice.
- Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to takeoff if anti-ice is required.

NOTE

- Anti-Ice systems must be turned on prior to flight into visible moisture and SAT of 10°C (50°F) or below. If anti-ice systems are required during takeoff, they should be turned on prior to setting takeoff thrust.
- Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff is made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes after takeoff will help to clear moisture on the wheels and brakes. Monitor WING TEMP gauge for overheat condition.

- 5. Lights:
  a. RECOG Light Switch — On.
  b. BCN/STROBE Light Switch — BCN/STROBE or STROBE.
  c. LDG LT-TAXI Switches — On, as desired.
- 6. IGNITION Switches — On.

Runway Lineup (Cont)

◆ 7. APR Switch — ARM. Check APR ARM light illuminated and APR ON light out.

NOTE

If either APR or autospoilers are not armed, a takeoff distance correction must be applied. Refer to the takeoff field length charts in Section V.

◆ 8. Annunciator Lights — Out, except STEER ON, TR ARM, SPOILER ARM and APR ARM.

NOTE

- *On aircraft 60-001 thru 60-093, except 60-079* ***not*** *incorporating SB 60-27-6,* the SPOILER EXT light will be illuminated with the thrust levers at IDLE.
- STAB HEAT, WSHLD HT, and NAC HT ON lights will illuminate if the corresponding systems have been turned on.
- L and R WS DEFOG lights will illuminate upon initial activation of the windshield defog system and remain illuminated until windshield temperature reaches 85°F (29°C).

After Takeoff

NOTE

If taxi and/or takeoff were on ice, snow, or slush, allow the wheels to spin down prior to gear retraction to throw off as much slush as possible.

1. LANDING GEAR Switch — UP. Landing gear should be fully retracted prior to retracting flaps.
2. Yaw Damper — Engage, as desired.
3. FLAP Switch — UP prior to V_{FE}.
4. IGNITION Switches — OFF unless ambient conditions require ignition to remain On.

NOTE

During periods of heavy precipitation, set IGNITION switches On to prevent possible engine flameout due to large quantities of water entering the engine.

5. SPOILER Lever — RET.
6. APR Switch — OFF.
7. LDG LT-TAXI Switches — OFF.
8. HYD PRESS Gauge — Check (1500 to 1575 psi).
9. Anti-Ice Systems — As required.

WARNING

Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions.

NOTE

- Anti-Ice systems must be turned on prior to flight into visible moisture and SAT of 10°C (50°F) or below.
- Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff is made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes after takeoff will help to clear moisture on the wheels and brakes. Monitor WING TEMP gauge for overheat condition.

Climb

10,000 Ft Checks:

1. NO SMOKING FASTEN SEAT BELT Switch — As required.
2. Pressurization — Check.

18,000 Ft (or Transition Altitude) Checks:

3. Altimeters (x3) — Set to 29.92" Hg (1013 hPa).
4. RECOG/PULSE Light Switch — OFF.
5. WSHLD DEFOG Switch — As desired.
6. OXY PRESS Gauge — Check.

Cruise

Once established at cruise altitude, crew duties consist mainly of monitoring aircraft systems indications and annunciators to assure proper operation. Monitor pressurization and engine instruments. Monitor fuel distribution and transfer fuel as required. Use small thrust adjustments as necessary to maintain desired cruise Mach.

Descent

1. WSHLD DEFOG Switch — As desired.
2. LDG ALT Selector — Check, destination field elevation is set.
3. Anti-Ice Systems — As required.

WARNING

Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions and during descent into visible moisture even if the SAT is below -40°C (-40°F).

NOTE

- Anti-Ice systems must be turned on prior to flight into visible moisture and SAT of 10°C (50°F) or below.
- If descending into an area with a high dew point, set WSHLD HEAT switch to WSHLD HEAT to provide windshield exterior defogging.

FL 180 (or Transition Level) Checks:

4. Altimeters (x3) — Set to field barometric pressure. Cross-check pilot's, copilot's, and standby instruments.
5. RECOG/PULSE Light Switch — RECOG or PULSE, as desired.
6. Pressurization — Check.
7. NO SMOKING FASTEN SEAT BELT Switch — On.
8. Cabin Check:
   a. Passengers Briefed.
   b. Swivel Seats — Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
   c. Work Tables and Toilet Doors — Check stowed.
   d. Aisle — Clear.
   e. Aft Cabin Door — Unobstructed.
9. Fuel — Balanced.

Approach

1. Circuit Breakers — Set.
2. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
3. Landing Data (VREF, VAPP, Distance) — Computed and set. Refer to Section V.

CAUTION

It is recommended that if turbulence is anticipated due to gusty winds, wake turbulence, or wind shear, the approach speed be increased. For gusty wind conditions, an increase in approach speed of one-half the gust factor is recommended.

4. Crew Approach Briefing — Complete.
5. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.

Before Landing

1. SPOILER Lever — ARM.
2. ENG SYNC Switch — OFF.
3. LANDING GEAR Switch — DN at VLO or less. Check for three green DOWN indications.

NOTE

If taxi and/or takeoff were on ice, snow or slush; ANTI-SKID Switch — Off, pump brakes 6 to 10 times, then ANTI-SKID Switch — On. Brake application will tend to crack any ice between brake discs and between the discs and wheels.

4. NOSE STEER Switch — Check ARM.

NOTE

The Nose Steer system will not arm unless the nose gear is down and locked.

5. LDG LT-TAXI Switches — As required.

NOTE

The left landing light will not illuminate unless the left main gear is down and locked. The right landing light will not illuminate unless the right main gear is down and locked.

6. L and R ANTI-SKID Lights — Extinguished.
7. Flaps — DN, check indication.
8. HYD PRESS Gauge — Check (1500 to 1575 psi).
9. IGNITION Switches — On.
10. Autopilot — Disengage.

NOTE

Control Wheel Master Switch (MSW) will also disengage yaw damper.

11. Yaw Damper — As desired.

Go Around

1. Autopilot — Disengaged.

NOTE

Depressing GO-AROUND button in left thrust lever handle will disengage autopilot and select flight director go-around mode.

2. Thrust Levers — Select T/O detent or as required.
3. Spoilers — Check retracted.
4. Flaps — 8°.
5. LANDING GEAR Switch — UP after positive rate of climb is established.
6. Climb at approach climb speed.
7. When clear of obstacles, accelerate to VREF + 20 and retract flaps.

Landing

1. Brakes — As required.

CAUTION

- If upon touchdown, one or more ANTI-SKID lights illuminate, anti-skid protection for the associated wheel is inoperative and has reverted to manual brake control. Apply brakes cautiously.
- **Do not** turn on cooling system during landing with anti-skid system operating. Initial voltage drop may cause false signals in the anti-skid system and dump brake pressure for 2 to 3 seconds.

2. Spoilers — Verify extended.

NOTE

- If autospoilers are not armed, Spoiler Lever — EXT.
- *On aircraft 60-001 thru 60-093, except 60-079, **not** incorporating SB 60-27-6,* select EXT even when autospoilers are armed. Autospoiler deployment may be delayed during soft landings.

3. Thrust Reversers — Deploy, as desired:

WARNING

When landing on snow covered runways, apply reverse thrust with caution as visibility may be impaired.

CAUTION

- Verify the nose wheel is firmly on the runway prior to deploying the thrust reversers. Initiating deployment of the thrust reversers before the nose wheel is firmly on the runway, can result in nose gear retraction.
- Use of thrust reversers on poorly cleaned or maintained runways may cause foreign object damage to engine fan blades.
- If full reverse power is maintained below 50 KIAS, reingestion of exhaust gases in the engine and foreign object damage may occur.

NOTE

- Thrust reverser arming will be delayed during soft landings.
- Excessive force applied to the thrust reverser levers may prevent the balk solenoid from releasing.

4. Nose Wheel Steering — Check STEER ON light illuminated below 90 knots.

After Landing/Clearing Runway

1. IGNITION Switches — OFF.
2. CAB AIR Switch — OFF.
3. Anti-Ice Systems:
   a. WSHLD DEFOG and WSHLD HEAT Switches — As required.
   b. WSHLD ALC Switch — OFF.
   c. STAB WING HEAT Switch — As required. Monitor WING TEMP indicator to prevent overheat condition.

CAUTION

If STAB HEAT light is not illuminated and DC ammeter indicates stabilizer heat operation, immediately set STAB WING HEAT switch to OFF.

   d. PITOT HEAT Switches — OFF.
   e. NAC HEAT Switches — As required.
4. Aircraft Lighting — ON, as desired.

NOTE

Nav lights should be on for all night operations.

5. SPOILER Lever — RET.
6. FLAP Switch — 20°, 8° or UP.
7. Unnecessary Avionics — OFF.
   a. Transponder — STBY or OFF.
   b. Radar — Confirm system is in standby (STBY) mode.
8. Thrust Lever (on engine started first) — CUTOFF (optional).

NOTE

Idle engine for 1 minute prior to thrust lever CUTOFF.

Shutdown

1. PARKING BRAKE and/or Chocks — Set.

CAUTION

If heavy braking was used during landing, setting the PARKING BRAKE will decrease brake cooling efficiency and increase the possibility of wheel fuse plug release. Therefore, use of chocks is recommended.

2. WSHLD DEFOG Switch — OFF.
3. Anti-Ice Systems — OFF.
4. *On aircraft with UNS Flight Management System*, FMS — Select OFF.
5. AVIONICS LEFT and RIGHT MASTER Switches — OFF.
6. Thrust Lever(s) — CUTOFF.
7. Fuel System — Check FUEL SYS light extinguished.
8. BCN/STROBE Switch — OFF.
9. EMERGENCY EXIT LIGHTS Switch (if installed) — OFF.
10. Standby Attitude Indicator — Cage (if applicable).
11. Coffee/Oven Switches (if installed) — Off.
12. START-GEN Switches — OFF.
13. INVERTER Switches — OFF.
14. EMER BAT Switches — OFF.
15. BATTERY Switches — OFF.
16. Controls Lock — Install.

Quick Turn-Around (One or No Engine Shutdown)

WARNING

TURN-AROUND LIMITS in Sections I and V of this manual must be observed.

1. LDG ALT Selector — Set landing field elevation of intended destination.
2. Fuel Control Panel and Quantity — Checked.
3. Nav Equipment — Set.
4. Cabin Doors — Closed and latched. DOOR Lights — Out.
5. COOL Switch — OFF.
6. AUX HT Switch — OFF.
7. Engine — Start (2 running).
8. START-GEN Switches — GEN.
9. Electric Power Monitor — Check. GEN lights extinguished.
10. AVIONICS LEFT and RIGHT MASTER Switches — ON.
11. FMS — Set.
12. Takeoff Data (V_1, V_R, V_2, Distance) — Computed and V-speeds set (refer to Section V).
13. Circuit Breakers — Set.
14. Anti-Ice Systems — As required.

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to taxi if the OAT is 10°C (50°F) or below and visible moisture is present.

15. Engine Instruments and N_1 Bugs — Check; verify left and right bugs agree within 1%.
16. Flight Controls — Check.

NOTE

- If spoilers are not retracted, advance one or both thrust levers to retract spoilers.
- *On aircraft 60-001 thru 60-093, except 60-079* ***not*** *incorporating SB 60-27-6,* the SPOILER EXT light will be illuminated with the thrust levers at IDLE.

17. Flaps — Set 20° or 8°, check indication.
18. Cabin Check:
    a. Passengers Briefed.
    b. Swivel Seats — Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
    c. Work Tables and Toilet Doors — Check stowed.
    d. Aisle — Clear.
    e. Aft Cabin Door — Unobstructed.
19. NO SMOKING FASTEN SEAT BELT Switch — On.

Quick Turn-Around (One or No Engine Shutdown) (Cont)

Taxi

1. Flight Instruments — Check.
2. Radar — As required.
3. Spoilers — Armed/Retracted. Check SPOILER ARM light illuminated.

NOTE

On aircraft 60-001 thru 60-093, except 60-079 ***not*** *incorporating SB 60-27-6,* the SPOILER EXT light will be illuminated with the thrust levers at IDLE.

4. Flaps — 20° or 8°, check indication.
5. Trims — Set for takeoff.
6. CAB AIR Switch — ON. Check CABIN AIR light (if applicable) extinguishes.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. Crew Takeoff Briefing — Complete.
9. Go to **Runway Lineup** procedure, this section.

Cold Weather Operation

Operational problems related to cold weather may occur unless proper preflight and inspection procedures are accomplished. Additionally, operational difficulties due to ice, snow, slush, or water accumulation may be encountered. The following instructions supplement the normal procedures and, when followed, will help ensure satisfactory operation of the aircraft and its systems in cold climatic conditions.

Preflight Preparation

It is essential to take off with an aerodynamically clean airplane. Low temperatures and precipitation associated with cold weather operation create problems while the airplane is on the ground, in that frost, ice and snow adhere to and accumulate on the surfaces of the airplane. All surfaces of the airplane (wing, vertical and horizontal stabilizers, flight controls, spoilers and flaps) must be free of frost, ice and snow before takeoff. During periods of precipitation, once the airplane has been de-iced, anti-icing is likely to be required to ensure that the airplane remains aerodynamically clean for departure. De-icing/anti-icing must be accomplished at the last possible time prior to takeoff to maximize the time that anti-icing will be able to provide protection (holdover time). Refer to Learjet Addendum — DE-ICING/ANTI-ICING for de-icing/anti-icing procedures.

Preflight Inspection

1. Conduct normal exterior inspection.
2. Check the entire aircraft (including top surface of horizontal stabilizer) for ice, snow, and frost. Brush off light snow. Remove all frost, encrusted snow, and ice.
3. Remove ice, snow, and dirt from landing gear shock struts and wheel wells. Check gear doors, position switches, squat switches, wheels, brakes, and tires.
4. Carefully inspect engines for frozen precipitation in fan duct and tailpipe. Under certain climatic conditions, ice can form on the back of fan blades and cause vibration during start.

Cold Weather Operation (Cont)

Engine Start

Use of a GPU for an engine start is recommended at ambient temperatures of 32°F (0°C) or below. Ensure GPU is regulated to 28 VDC, has adequate capacity (at least 500 amps), and is limited to 1500 amps maximum.

If the engines are exposed to extremely cold temperatures (below -40°F [-40°C]) for an extended period, the engines should be preheated prior to attempting a start. For ambient temperatures between -40°F (-40°C) and -65°F (-54°C), direct warm air flow into each engine for a minimum of 30 minutes prior to engine start. Ensure that the engine oil temperature indicators indicate above -40°C before attempting a start.

During engine starts in cold weather, engine acceleration is slower than normal. Additionally, higher than normal oil pressure can be expected.

CAUTION If ITT is rising rapidly and appears likely to exceed the start limit, abort start attempt.

When the aircraft has been cold soaked at ambient temperatures below -13°F (-25°C), the engines should be operated a minimum of 3 minutes to bring the hydraulic system up to normal operating temperature.

Cold Weather Operation (Cont)

Taxiing

Use normal taxi procedures if the ramp and taxiways are clean and dry. If it is necessary to taxi on ice, snow, slush, or water, taxi at reduced speed and allow greater distance for decreased braking efficiency.

If taxi is to be accomplished through slush or snow, use the brakes to create some friction induced heating of the brake discs to prevent the brakes from freezing.

Use both engines for taxi on slippery surfaces. Directional control may be difficult to maintain during one-engine taxi on a slick surface.

Use anti-ice systems as required (if icing conditions exist or are expected.)

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to taxi if the OAT is 10°C (50°F) or below and visible moisture is present.

Insofar as possible, taxi should be accomplished with the flaps up on snow or slush covered surfaces.

Avoid taxiing in the exhaust wake or propeller wash of other aircraft on other than hard packed or dry surfaces.

Thrust reversers should be used with extreme caution on slippery surfaces and only when absolutely necessary to maintain directional control.

Do not use thrust reversers if taxiways and ramps are covered with slush, ice, standing water or snow except in the interest of safety.

CAUTION

Use of reverse thrust on surfaces treated with sand or other materials may cause foreign object damage to engine fan blades.

Cold Weather Operation (Cont)

Takeoff

If anti-ice systems are required for takeoff, the systems should be energized prior to setting takeoff thrust.



To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to takeoff if anti-ice is required.

Do not take off with runway water or slush accumulation of 3/4 inch (19 mm) or more. Refer to the **WET/CONTAMINATED RUNWAY DATA** for guidance material pertaining to takeoff on a wet or contaminated runway.

Do not take off with frost, snow, or ice on the wings or aircraft control surfaces, including the horizontal stabilizer and elevators.



Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

After Takeoff

After takeoff from a snow-covered or slush-covered runway, delay retracting landing gear to allow residual slush to be thrown or blown off.

Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff was made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes will help to clear moisture on the wheels and brakes. Monitor WING TEMP indicator for overheat condition.

Before Landing

If taxi or takeoff was made from a snow-covered or slush-covered field, it is recommended that the following procedure be used to help crack any ice between brake discs and between the brake discs and wheels:

1. After landing gear is extended, set ANTI-SKID switch to OFF.
2. Pump brakes 6 to 10 times. Use moderate to heavy braking pressure.
3. Prior to touchdown, set ANTI-SKID switch On and check ANTI-SKID lights are out.

Cold Weather Operation (Cont)

Landing

Refer to the **WET/CONTAMINATED RUNWAY DATA** for guidance material pertaining to landing on a wet or contaminated runway.

After Clearing Runway



For taxi after landing on a slush or snow covered field, it is recommended that the flaps not be retracted above 20°. This will protect flaps and wing from damage in the event ice or snow has accumulated on the flaps.

Shutdown and Postflight

When the aircraft must be parked outside in extremely cold or fluctuating freeze/thaw temperatures, perform the following in addition to the normal shutdown and post-flight procedures:

1. Chock main gear wheels before releasing parking brake. Do not leave aircraft parked for extended periods in sub-freezing weather with parking brake set.
2. Remove ice, snow, and dirt from landing gear shock struts and wheel wells. Check gear doors, position switches, squat switches, wheels, and tires.
3. Remove ice, snow, and dirt from flaps and flap tracks before retracting flaps.
4. If the aircraft is to be parked for an extended period at ambient temperatures of 20°F (-6.7°C) or below, it is recommended that the crew oxygen masks be stowed in a heated room or the cabin should be warmed to at least 20°F (-6.7°C) before use.
5. If the aircraft is to remain in subfreezing temperatures for an extended period, remove water and beverage containers from the aircraft. Disconnect water supply tank, depress faucet cold tap and pump water from the line. Ensure the toilet is serviced to prevent freezing of the flush fluid.
6. Install aircraft protective covers.
7. If the aircraft will be exposed to extremely cold temperatures for an extended period, it is recommended that the batteries be removed and stored in a warm area if possible.

Ice Detection

During atmospheric conditions conducive to icing, identification of ice on aircraft surfaces may be accomplished by the following methods:

1. During daylight operations, a visual inspection of the lower corners of the windshield or the wing leading edge for ice accumulation can be made.
2. The windshield ice detect lights will indicate ice or moisture formation on the windshield during night operations. These lights are illuminated whenever the BATTERY switches are On and will cause red areas approximately 1-1/2 inches (38 mm) in diameter to appear on the windshield if ice or moisture is encountered. The light on the pilot's side is located in the anti-ice airstream and the light on the copilot's side is located outside the anti-ice airstream. Therefore, the copilot's light must be monitored whenever windshield heat or alcohol anti-ice systems are operating. The lights indicate ice encounters when SAT is below freezing and moisture encounters when SAT is above freezing.
3. The wing inspection light may be used to visually inspect the right wing leading edge for ice accumulation during night operations. The light is illuminated by depressing the WING INSP LIGHT button. This switch may be located on the copilot's switch panel or on the instrument panel. The light illuminates a black dot on the outboard wing leading edge to enhance visual detection of ice accumulation.

Anti-Ice Systems

Anti-ice systems must be turned on prior to operation in icing conditions.

Icing conditions exist when outside air temperature (OAT) on the ground and for takeoff is 10°C (50°F) or below, or the static air temperature (SAT) in flight is 10°C (50°F) to -40°C (-40°F), and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, or ice crystals). Nacelle heat must be On during descent into visible moisture even if the SAT is below -40°C (-40°F).

Icing conditions also exist when the OAT on the ground and for takeoff is 10°C (50°F) or below when operating on ramps, taxiways, or runways where surface snow, ice, standing water, or slush may be ingested by the engines, or freeze on engines, nacelles, or engine sensor probes.

Operate the nacelle heat system in accordance with the **NACELLE HEAT** limits in Section I.

CAUTION

To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions (either in flight or prior to taxi.)

If icing conditions are encountered and the anti-ice systems have not been energized, turn them on prior to significant ice accumulation. Observe recommendations for normal use of all anti-ice systems.

WARNING

Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

In the event of significant ice accumulation or failure of any portion of the anti-ice system, refer to **Inadvertent Icing Encounter** and/or anti-icing system failure procedures in Section IV.

When using anti-ice systems, maintain sufficient engine speed to keep the wing temp indicator in the green band. This will provide sufficient bleed air for all bleed air anti-icing systems. Use of spoilers may be required for descents and/or decelerations.

When using anti-ice systems at high altitude, the cabin altitude may increase unless engine speed is maintained to compensate for the additional bleed air extraction.

Minimize the duration of icing encounters as much as practical. Minimize holding in icing conditions with flaps extended. This includes requesting an altitude above or below icing conditions, if practical.

Anti-Ice Systems (Cont)

Intermittently operating with the autopilot off will allow more readily detectable changes in flight control feel.

If flight has been conducted in icing conditions, remove any accumulated ice prior to next flight.

Aircraft anti-icing is accomplished through the use of electrically heated anti-ice systems, engine bleed-air heated anti-ice systems, and an alcohol anti-ice system. Electrically heated systems include pitot-static probes, engine inlet air temperature/pressure sensors, stall warning vanes, total temperature probe, and horizontal stabilizer. Engine bleed air is utilized to heat the wing leading edge, windshields, nacelle inlets, engine inlet guide vanes, and engine fan spinners. An alcohol anti-ice system is installed as a back-up for the pilot's windshield bleed air anti-ice system.

An electrically heated windshield provides defogging of the windshield interior. The heat output of the windshield is not sufficient to prevent ice formation. Therefore, bleed air windshield heat (WSHLD HEAT) should be turned on prior to entering icing conditions.

Systems controls and control functions are as follows:

1. STAB WING HEAT Switch — Controls wing heat system (bleed air) and the horizontal stabilizer heat system (electric).
2. NAC HEAT Switches — Control engine inlet and inlet guide vane anti-icing (bleed air) and engine inlet air temperature/pressure sensor electric heaters. Anti-icing bleed air is continually routed to the engine fan spinner.
3. PITOT HEAT Switches — Energize pitot-static probe, stall warning vane, and total temperature probe electric heaters.
4. WSHLD ALC Switch — Controls pilot's windshield alcohol anti-ice system.
5. WSHLD HEAT Switch — Controls bleed air to the windshield for anti-ice and ground rain removal.
6. ● **On aircraft 60-001 thru 60-113 *not* incorporating SB 60-30-2,** WSHLD DEFOG Switch — Controls the electrically heated windshield for interior defog.
6. ● **On aircraft 60-114 & Subsequent, and prior aircraft incorporating SB 60-30-2,** WSHLD DEFOG NORM/LOW Switch — Controls the electrically heated windshield for interior defog. The intermediate LOW setting may be used during low humidity conditions (dewpoint less than 70°F (21°C).

Anti-Ice Systems (Cont)

Exterior Windshield Anti-Ice and Rain Removal

Bleed airflow to the windshield exterior is pilot controlled through the WSHLD HEAT switch. In the OFF position, no airflow is available. In the WSHLD HEAT position, maximum airflow is available unless the WSHLD OV HT light is illuminated. The pilot controlled valve will fully open or close within approximately 15 seconds.

To activate the system:

1. WSHLD HEAT Switch — WSHLD HEAT. The green WSHLD HT light will illuminate when the valve begins to open. If the amber WSHLD OV HT light illuminates, the airflow will automatically stop, until the windshield has cooled, then resume.
2. To reduce flow in the event of excessive noise or overheating: WSHLD HEAT Switch — OFF, then HOLD when flow is acceptable.

Windshield Alcohol Anti-Ice

The windshield alcohol anti-ice system provides an alternate way to anti-ice the pilot's windshield.

To activate and use the system:

1. WSHLD ALC Switch — WSHLD ALC. This will anti-ice the pilot's windshield only and give alcohol flow for approximately 45 minutes. The amber ALC LOW light will illuminate when alcohol level is low.
2. WSHLD ALC Switch — OFF when alcohol is depleted or when out of icing conditions.
3. After landing, assure alcohol reservoir is properly replenished.

Anti-Ice Systems (Cont)

Wing Anti-Ice

The wing anti-ice system utilizes engine bleed air directed through diffuser tubes in the wing leading edge for anti-icing.

Wing-heat bleed air exits overboard through the center wing/wheel well area. If takeoff was made from a snow or slush covered runway, activation of STAB WING HEAT for approximately 10 minutes will help to clear moisture on the wheels and brakes. Monitor WING TEMP indicator for overheat condition.

To activate the system:

1. STAB WING HEAT Switch — STAB WING HEAT. It is normal for the amber WING HT light to illuminate upon initial activation of the wing heat system until the leading edge temperature reaches the normal operating range.
2. Monitor WING TEMP Indicator. Adjust engine power to keep the wing temp indicator in the green band. When the indicator pointer is in the green band, the wing temperature is warm enough to prevent wing icing. When the indicator pointer is in the blue band, the wing temperature is cold enough for ice to form on the leading edge. Visually monitor both wings for any ice accumulation. At night, the wing inspection light will be required. If indicator progresses into the red band, structure is approaching "too hot" condition.

NOTE

If the system is on with sufficient engine power and any or all of the following indications are observed, a system failure has occurred:

- The amber WING HT light is illuminated and the WING TEMP indicator pointer is in the blue band.
- Either wing shows signs of ice accumulation.

Refer to **WING HT Light Illuminated** procedure, in Section IV.

Anti-Ice Systems (Cont)

Horizontal Stabilizer Anti-Ice

The horizontal stabilizer anti-ice system utilizes sequenced electrical heating elements along the horizontal stabilizer leading edge for anti-icing. The system is controlled by the STAB WING HEAT Switch. Control circuits for the system are wired through the squat switch to prevent overheating the elements when the airplane is on the ground.

To activate the system:

1. STAB WING HEAT Switch — STAB WING HEAT.
2. Monitor AMPS for an increase in load from the heating elements.

CAUTION

For ground operation, to prevent overheating of the horizontal stabilizer heating elements, ensure that the amber STAB HEAT light is illuminated. On the ground, activation of the system initiates a self test characterized by the illumination of the STAB HEAT light and an AMPS increase for approximately three seconds. If the STAB HEAT light is not illuminated and AMPS do not reduce within five seconds, **immediately** set STAB WING HEAT switch OFF. Flashing of the STAB HEAT light during or after the self test indicates a failed heating element. The test sequence requires a minimum of three minutes between each test.

NOTE

- During flight, if an electrical heating element should fail, the amber STAB HEAT light on the annunciator panel will illuminate. The remaining elements will continue to operate. Monitor AMPS for current load.
- The cooling system is inoperative when the STAB WING HEAT switch is in the On position.

Anti-Ice Systems (Cont)

Nacelle Heat

The NAC HEAT Switches select nacelle heat and engine inlet guide vane heat (bleed air), and engine inlet air pressure and temperature sensor heat (electrical).

To activate the system:

1. L and R NAC HEAT Switches — NAC HEAT. The green NAC HT ON light will illuminate anytime a NAC HEAT switch is set On. The respective N1 bug will show the proper anti-ice on power rating.

CAUTION

- To prevent damage to engine inlet sensors, nacelle heat operation should be limited to 5 seconds if the engine is not running.
- To reduce the probability of engine damage, select NAC HEAT On at least 2 minutes prior to entering icing conditions and during descent into visible moisture even if the SAT is below -40°C (-40°F).

NOTE

- Illumination of the amber L or R NAC HT lights with the NAC HEAT switches On indicates that bleed air pressure is not being applied to the nacelle heat system because of a malfunction.
- Illumination of the amber L or R NAC HT lights with the NAC HEAT switches OFF indicates that bleed air pressure is being applied to the nacelle heat system because of a malfunction.
- Momentary illumination of the amber L or R NAC HT lights during engine starts is normal.

Anti-Ice Systems (Cont)

Pitot-Static Heat

Anti-ice protection for pitot-static probes, stall warning vanes, and total temperature probe (squat switch in the air mode) is accomplished by setting the L and R PITOT HEAT switches On. The R PITOT HEAT switch also controls standby pitot-static probe heat.

A pitot heat monitor system provides the crew with a means of determining if sufficient current is being applied to the pitot-static probe heating elements. With the BATTERY and PITOT HEAT switches On, illumination of the amber PITOT HT light indicates insufficient current is being applied to a pitot-static probe heating element. A failure in any system (left, right or standby) will cause the light to illuminate. The light will also illuminate whenever the BATTERY switches are On and either PITOT HEAT switch is OFF.

Windshield Defog

Windshield interior defogging is provided by electrically heated windshield panels. Windshield exterior defogging is provided by the windshield anti-ice and rain removal system.

To provide windshield interior defogging:

1. ● **On aircraft 60-001 thru 60-113 *not* incorporating SB 60-30-2,** WSHLD DEFOG Switch — WSHLD DEFOG. This activates the electrically heated windshield panels.

1. ● **On aircraft 60-114 & Subsequent, and prior aircraft incorporating SB 60-30-2,** WSHLD DEFOG NORM/LOW Switch — NORM. This activates the electrically heated windshield panels. The intermediate LOW setting may be used during low humidity conditions (dewpoint less than 70°F (21°C).

NOTE

Normal system operation is indicated by illumination of the L and R WS DEFOG lights when the system is activated (windshield temperature below 85°F [29°C]). When the windshield is heated above 85°F (29°C), the WS DEFOG lights will extinguish. Should a WS DEFOG light illuminate anytime other than initial activation of the system, refer to WS DEFOG LIGHT ILLUMINATED procedure in Section IV.

To provide windshield exterior defogging:

NOTE

Use this procedure when descending into areas of high dewpoint where windshield fogging is likely.

1. At start of descent, WSHLD HEAT Switch — WSHLD HEAT.
2. Leave windshield defog and windshield heat on until shutdown.

Annunciations

The cockpit annunciator panel lights may be tested by depressing the test switch on either side of the panel. During the first 3 seconds of the lamp test, the two bulbs in each light will alternately illuminate. Thereafter, all the bulbs will illuminate until the test switch is released. Photoelectric cells, outboard of each ENG FIRE PULL Switch, automatically dim the annunciator panel lights to a level corresponding to existing light in the cockpit or to a minimum preset level for a totally dark cockpit. Other cockpit annunciator lights are dimmed when the NAV lights are on.

If an annunciator light illuminates and the condition is corrected, the light will extinguish. If the condition recurs, the light will again illuminate.

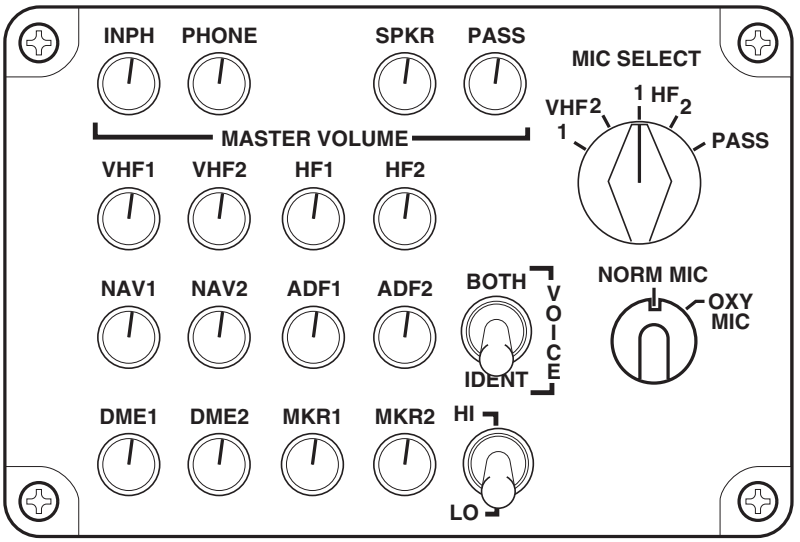
Illumination of any red cockpit annunciator will cause both Master WARN lights to illuminate and flash. Depressing the Master WARN/CAUT light will extinguish the Master WARN light even though the annunciator light may be flashing (ENTRY DOOR, AFT CAB DOOR, L or R STALL, CABIN FIRE, or either ENG FIRE PULL).

Illumination of any amber cockpit annunciator, except starter engaged lights (during ground operations), will cause both Master CAUT lights to illuminate and flash unless the master caution feature has been inhibited. Depressing the Master WARN/CAUT light will extinguish the Master CAUT light even though the annunciator light may be illuminated. The annunciator light will remain on as long as the condition exists. When the aircraft is on the ground, the master caution feature may be inhibited by depressing and holding either Master WARN/CAUT light until the Master CAUT light illuminates steadily. After lift-off, the master caution feature will revert to the normal (uninhibited) mode.

Some white annunciators may be extinguished in flight by depressing either Master WARN/CAUT light. Depressing either annunciator lights test switch will cause the annunciators to illuminate again. Any white annunciators which were extinguished in flight will again illuminate shortly after touchdown.

Audio Control System

The audio control system panels provide a means of controlling communications and/or navigation audio information being received or transmitted. The panel also controls audio communication within the cabin.



Audio Control Panels
Figure 2-3

Audio Control System (Cont)

MIC SELECT Switch

The MIC SELECT Switch is a multi-position rotary-type switch labeled VHF 1, VHF 2, HF 1, HF 2 and PASS. This switch provides the proper microphone audio inputs for the respective functions.

1. VHF 1, VHF 2, HF 1 and HF 2 Positions — When any of these positions are selected, microphone inputs are provided for the respective transceiver. Microphone must be keyed to transmit.
2. PASS Position — When this position is selected, the pilot or copilot, utilizing this function, may speak to the passengers through the passenger speaker. Microphone must be keyed to transmit.

NOTE

PASS should not be selected on both audio control panels simultaneously as degradation of the volume level may result.

NORM MIC/OXY MIC Switch

1. NORM MIC Position — When the switch is in this position, voice transmissions are accomplished with the headset microphone or hand-held microphone.
2. OXY MIC Position — When the switch is in this position, voice transmissions are accomplished with the oxygen mask microphone. Both cockpit speakers, phone and interphone function (see **Volume Controls**) will be active. The microphone must be keyed to transmit to the passengers or via a communications radio.

Audio Control System (Cont)

Volume Controls

The volume controls consist of four MASTER VOLUME (INPH, PHONE, SPKR and PASS) controls. Each control is rotated to regulate the overall volume level to the applicable output device. The INPH and SPKR controls have a push-ON/push-OFF function. In the "ON" position, the control knob will protrude further than in the "OFF" position. Also, the controls will illuminate in the "ON" position.

1. INPH Volume — This control regulates the volume level of the crew interphone system. The interphone employs a voice-activated hot microphone.
2. SPKR Volume — This control regulates the volume level of the on-side cockpit speaker audio.
3. PHONE Volume — This control regulates the volume level of the on-side headphone audio.
4. PASS Volume — When PASS is selected on the MIC SELECT Switch, this control regulates the volume level of the passenger speaker audio.

Audio Control System (Cont)

Radio Monitor Switches

Each control has a push-ON/push-OFF function and a volume control which is rotated to regulate the volume level of individual audio inputs. In the "ON" position, the control knob will protrude further than in the "OFF" position. Also, the control will illuminate in the "ON" position. Radio monitor switches on the audio control panel are labeled and perform the following functions:

1. VHF 1 and VHF 2 Switches — When in the "ON" position, provide audio from the VHF 1 and VHF 2 transceivers respectively.
2. HF 1 and HF 2 Switches — When in the "ON" position, provide audio from the HF 1 and HF 2 (if installed) transceivers respectively.
3. NAV 1 and NAV 2 Switches — When in the "ON" position, provide audio from the NAV 1 and NAV 2 receivers respectively.
4. ADF 1 and ADF 2 Switches — When in the "ON" position, provide audio from the ADF 1 and ADF 2 (if installed) receivers respectively.
5. DME 1 and DME 2 Switches — When in the "ON" position, provide audio from the DME 1 and DME 2 transceivers respectively.
6. MKR 1 and MKR 2 Switches — When in the "ON" position, provide audio from the MKR 1 and MKR 2 receivers respectively.

Audio Control System (Cont)

BOTH/VOICE/IDENT Switch

This switch controls the audio filtering for the NAV and ADF receivers.

1. BOTH Position — When the switch is in this position, both the station identifier and voice transmissions will be heard. The BOTH position is the normal position.
2. VOICE Position — When the switch is in this position, only the voice transmissions will be heard.
3. IDENT Position — When the switch is in this position, only the station identifier will be heard.

Marker Beacon HI/LO Switch

The HI/LO switch on the pilot's audio control panel controls the #1 marker beacon receiver and the HI/LO switch on the copilot's audio control panel controls the #2 marker beacon receiver.

1. HI Position — When the switch is in this position, the marker beacon receiver sensitivity is increased.
2. LO Position — When the switch is in this position, the marker beacon receiver sensitivity is decreased.

Audio Control — Flight Operation

1. Applicable MASTER VOLUME Controls — Set to the "ON" position and rotate to a comfortable listening level.
2. Applicable Radio Monitor Switches — Set to the "ON" position and rotate to a comfortable listening level.

NOTE

The VHF 1 and VHF 2 volume controls do not affect sidetone levels. The HF 1 and HF 2 volume controls will affect the sidetone level on most models since audio and sidetone utilize a common line from the transceivers. Some HF transceivers do not have sidetone capabilities.

3. MIC SELECT Switch — Rotate to desired position.

Autopilot/Flight Guidance System

A Collins Autopilot/Flight Guidance system is installed to provide automatic flight control and guidance for climb, cruise, descent, and approach. The system's flight control computer provides dual-channel flight guidance, and either channel can be coupled to the autopilot. Mode selection and annunciation for each flight guidance channel and engage controls for autopilot and yaw damper are provided through the glareshield mounted Flight Control Panel (FCP). Mode and system status annunciation is also provided on the appropriate EFIS displays.

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the autopilot/flight guidance system.

Autopilot/Flight Director Mode Selection

Autopilot and flight director modes are selected by depressing the applicable mode selector button on the FCP. Flight director only mode selection is accomplished by depressing the applicable mode selector button without the autopilot engaged. A light above the mode selector button will illuminate if all conditions for the mode are satisfied. Engaged autopilot and flight director modes may be disengaged by depressing the selector button a second time or selecting an incompatible mode. Autopilot/flight director mode engagement and arming is also annunciated on the associated EFIS displays.

Self-Test

The system initiates a self-test sequence when the system is powered up (LEFT and RIGHT AVIONICS MASTER switches ON). If the self-test sequence is not successfully completed, the autopilot will not engage and an "FD" flag will be displayed on the EFIS displays.

Autopilot/Flight Guidance System (Cont)

Autopilot Engagement

1. AP XFR Button — Select the desired flight director (pilot's or copilot's) to couple to the autopilot. A green triangle, on the FCP, will illuminate and point to the side which will couple to the autopilot, when engaged.
2. AP Button — Depress. Green AP Light will illuminate and a green AP ← or AP → (as appropriate) annunciation will appear on the primary flight displays. The yaw damper will also engage if not already engaged.

NOTE

- The autopilot will not engage with the PITCH TRIM selector switch in the OFF position.
- Upon engagement, if no modes are selected, the autopilot will automatically assume the attitude hold mode and maintain the attitude existing at the time of engagement.

Autopilot Disengagement

- If autopilot is engaged, depressing the AP Button will disengage the autopilot.
- Either Control Wheel Trim switch (arming button depressed) moved in any of four directions (NOSE UP, NOSE DN, LWD, or RWD) will disengage the pitch and roll axes.
- Either Control Wheel Master switch (MSW), when depressed, will disengage the pitch and roll axes, and the yaw damper.
- PITCH TRIM selector switch, when moved to OFF position, will disengage the pitch and roll axes.
- Moving the pedestal NOSE DN-OFF-NOSE UP switch to NOSE UP or NOSE DOWN will disengage the pitch and roll axes.
- Depressing the GO-AROUND button (left thrust lever knob) will disengage the pitch and roll axes and select flight director go-around mode.

NOTE

Whenever the autopilot is disengaged by pilot action, the autopilot disengage tone will sound, and the autopilot engaged annunciation on the EFIS and the FCP will no longer be displayed.

Autopilot/Flight Guidance System (Cont)

FMS to Autopilot/Flight Director Interface

When FMS is the active NAV source on the pilot's or copilot's EFIS, lateral FMS steering can be obtained through the autopilot/flight director NAV mode.

On aircraft equipped with a single Collins FMS:
Roll steering is normally limited to 25°. If 1/2 BANK is selected on either flight director, the flight management system limits roll steering commands to 12.5° to both flight directors.

On aircraft equipped with a dual Collins FMS:
Roll steering is normally limited to 25°. With the autopilot engaged, if 1/2 BANK is selected on the autopilot-coupled flight director, the flight management system limits roll steering commands to 12.5°. If the autopilot is not engaged, selecting 1/2 BANK on either flight director will limit roll steering commands to 12.5° through both FMSs to both flight directors.

On aircraft equipped with dual UNS FMS:
Roll steering is limited to 25° at altitudes up to and including 35,000 feet, decreases linearly from 25° to 12.5° as the altitude increases to 41,000 feet, and remains at 12.5° above 41,000 feet.



NAV operation with 1/2 BANK selected on the flight director may result in overshoot of the next leg course below 41,000 feet.

Programmed en route UNS VNAV descent profiles can be coupled to the autopilot/flight director NAV and VNAV mode. Vertical paths defined as part of a UNS approach can be coupled to the autopilot/flight director APPR and VNAV mode. Lateral steering for a UNS approach is coupled through the APPR mode. UNS VNAV Flight Path Angle (FPA) is limited to -6° enroute and -3.7° during approach.

Programmed UNS procedural legs (i.e., SIDs and STARs) can be coupled to the autopilot/flight director NAV mode. Part of the programmed procedure may include a procedural heading (PROCHDG). When the UNS is operating in the procedural heading mode, steering commands to the autopilot/flight director will be relative to the programmed procedural heading and not the displayed heading bug. Therefore, pilots should not rely on the displayed heading bug for lateral guidance when in procedural heading mode.

Autopilot/Flight Guidance System (Cont)

Control Wheel Master Switch (MSW)

Depressing the Control Wheel Master Switch (MSW) on the outboard horn of either control wheel will disengage the autopilot pitch and roll axes and the yaw damper.

Control Wheel Trim Switches (Vertical and Lateral Command)

When either Control Wheel Trim switch (arming button depressed) is moved to any of the four positions (LWD, RWD, NOSE UP or NOSE DN), an aircraft trim input is made and the autopilot will disengage. If the arming button is not depressed, the on-side switch may be used to input lateral commands (LWD and RWD) and vertical commands (NOSE UP and NOSE DN) to the autopilot. Using this feature causes active modes (except GS) in the applicable axis to disengage and revert to the attitude hold mode. Armed modes are not effected. The control wheel trim switch has no effect on the flight director.

SYNC Switches

The SYNC switches in the control wheels are normally used with the on-side flight director to change a vertical mode (except GS) reference values without reselecting the mode. The only lateral mode in which SYNC switches are active is roll attitude hold (ROLL).

FD CLEAR Switches

Depressing the FD CLEAR switch in either control wheel will remove the V-bars and cancel any selected vertical or lateral mode from the on-side flight director. FD CLEAR has no effect if the autopilot is coupled to the on-side flight director.

GO-AROUND Switch

Depressing the GO-AROUND switch in the left thrust lever knob will disengage the autopilot and select flight director GA mode.

Autopilot/Flight Guidance System (Cont)

Yaw Damper Engagement

- Yaw damper will automatically engage each time the autopilot is engaged.
- If the yaw damper is not engaged, depressing the YD Button will engage the yaw damper.

NOTE

Yaw damper engagement is annunciated with a green indicator light above the YD Button on the FCP. Yaw damper engagement is not annunciated on the EFIS displays.

Yaw Damper Disengagement

- If yaw damper is engaged, depressing the YD Button will disengage the yaw damper.
- Depressing either Control Wheel Master Switch will disengage the yaw damper.

NOTE

Whenever the yaw damper is disengaged by pilot action, the yaw damper disengage tone will sound, and the yaw damper engaged annunciation on the FCP will no longer be displayed.

Autopilot/Flight Guidance System (Cont)

Rudder Boost System

The rudder boost system reduces rudder forces, increases directional control effectiveness and improves takeoff performance. Whenever the flaps are 8° or lower and the pilot exerts approximately 50 pounds of rudder pedal force the system engages (if armed) and using the yaw damper servo assists the pilot in deflecting the rudder. A RUDDER BOOST switch is used to arm the system and system status is provided by green RB (active) and amber RB (fail) lights on the glareshield mounted autopilot controller. If a conflict exists between the yaw damper and rudder boost commands, the rudder boost system will override the yaw damper.

Self-Test

The system initiates a self-test when the system is powered up (RUDDER BOOST switch ON and both AVIONICS MASTER switches ON). During the self-test sequence, the amber RB fail light will be continuously displayed. Successful completion of the self-test sequence will extinguish the amber RB light and arm the rudder boost system. Failure of the self-test sequence will leave the amber RB light illuminated and rudder boost will not be armed.

Arm Rudder Boost System

If the system is armed, flaps are 8° or lower and a rudder pedal force of approximately 50 pounds or more is present, the rudder boost computer will activate rudder boost and assist the pilot in deflecting the rudder. The green RB light will illuminate to indicate rudder boost is active. Failure of the rudder boost system is indicated by illumination of the amber RB light.

Disarm Rudder Boost System

- Setting the RUDDER BOOST switch to OFF will disengage rudder boost.
- Depressing either Control Wheel Master Switch (MSW) will disable rudder boost while the switch is held.
- Retracting the flaps will disengage rudder boost.

Avionics System

Electronic Flight Instrument System *(Aircraft with Dual UNS-1B FMS)*

The electronic flight instrument system is a Collins 4-tube IDS-850 integrated display system with a single sensor display unit. The EFIS consists of a primary flight display (PFD) and a multifunction display (MFD) on both pilot's and copilot's instrument panels, one sensor display unit (SDU), an integrated avionics processor system (IAPS), one course and heading panel (CHP), two EFIS CONTROL panels (ECP), two Control Display Units (CDU), and two EFIS Radar Panels (ERP).

The EFIS is used to display airplane altitude, airspeed/Mach, vertical speed, air temperature, attitude data, navigational data, flight director commands, mode annunciators, weather, checklists, warnings, and diagnostic messages.

The primary means of determining avionics status is flags and annunciations in the normal EFIS displays. AVIONICS STATUS messages on the MFD indicate possible degraded operation. Use additional means to verify proper system operation.

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the EFIS system.

Refer to the UNS-1B Operator's Manual for a detailed description and operation of the EFIS Radar Panel (ERP).

EFIS CONTROL Panel

An EFIS control panel is installed on both the pilot's and copilot's instrument panel. Each panel controls its respective EFIS. Each switch is an alternate action switch. On-side selection is indicated by a green annunciation and cross-side or reversionary mode selection is indicated by an amber annunciation.



This switch selects the attitude heading system for the respective EFIS display, autopilot and other systems requiring attitude or heading data. The switch is used to recover attitude and heading data if the on-side AHS fails.

Whenever cross-side AHS data is selected, the pitch, roll, and heading comparators will be disabled, and all equipment normally sourced by the on-side AHS will be sourced by the cross-side AHS.

Avionics System (Cont)



This switch selects the air data system for the respective EFIS display, autopilot and other systems requiring air data. The switch is used to recover air data if the on-side ADC fails.



This switch selects the control display unit and ERP for the respective EFIS display. The switch is used to recover control if the on-side CDU and/or ERP fails.



This switch selects the active transponder system (1 or 2). Transponder 1 is normally controlled by the left radio tuning unit (RTU) and transponder 2 by the right RTU.



This reversionary mode selection switch is used to recover data on the primary flight display. When actuated in the REV mode, the adjacent MFD will assume the functions of the PFD. This would be used if a PFD tube fails.



This switch is used to disable the on-side RTU. In the normal mode, the RTU will control the on-side radios. When switched to the OFF mode, the RTU will blank and all radios will be controlled by the cross-side RTU. This would be used if the on-side RTU fails.

Avionics System

Electronic Flight Instrument System *(Aircraft with Single or Dual Collins FMS)*

The electronic flight instrument system is a Collins 4-tube IDS-850 integrated display system with a single sensor display unit. The EFIS consists of a primary flight display (PFD) and a multifunction display (MFD) on both pilot's and copilot's instrument panels, one sensor display unit (SDU), an integrated avionics processor system (IAPS), one course and heading panel (CHP), two EFIS control panels (ECP) and two control display units (CDU).

The EFIS is used to display airplane altitude, airspeed/Mach, vertical speed, air temperature, attitude data, navigational data, flight director commands, mode annunciators, weather, checklists, warnings, and diagnostic messages.

The primary means of determining avionics status is flags and annunciations in the normal EFIS displays. AVIONICS STATUS messages on the MFD indicate possible degraded operation. Use additional means to verify proper system operation.

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the EFIS system.

EFIS CONTROL Panel

An EFIS control panel is installed on both the pilot's and copilot's instrument panel. Each panel controls its respective EFIS. Each switch is an alternate action switch. On-side selection is indicated by a green annunciation and cross-side or reversionary mode selection is indicated by an amber annunciation.



This switch selects the attitude heading system for the respective EFIS display, autopilot and other systems requiring attitude or heading data. The switch is used to recover attitude and heading data if the on-side AHS fails.

Whenever cross-side AHS data is selected, the pitch, roll, and heading comparators will be disabled, and all equipment normally sourced by the on-side AHS will be sourced by the cross-side AHS.

Avionics System (Cont)



This switch selects the air data system for the respective EFIS display, autopilot and other systems requiring air data. The switch is used to recover air data if the on-side ADC fails.



This switch selects the control display unit for the respective EFIS display. The switch is used to recover control if the on-side CDU fails.



This switch selects the active transponder system (1 or 2). Transponder 1 is normally controlled by the left radio tuning unit (RTU) and transponder 2 by the right RTU.



This reversionary mode selection switch is used to recover data on the primary flight display. When actuated in the REV mode, the adjacent MFD will assume the functions of the PFD. This would be used if a PFD tube fails.



This switch is used to disable the on-side RTU. In the normal mode, the RTU will control the on-side radios. When switched to the OFF mode, the RTU will blank and all radios will be controlled by the cross-side RTU. This would be used if the on-side RTU fails.



This switch is used to disable remote tuning of all radios via the CDUs and FMS autotune functions. In the normal mode, the radios may be controlled by the RTU, CDUs or FMS autotune function. When switched to the OFF mode, only the RTUs may be used to control the radios.

Avionics System

Electronic Flight Instrument System *(Aircraft with Dual UNS-1C FMS)*

The electronic flight instrument system is a Collins 4-tube IDS-850 integrated display system with a single sensor display unit. The EFIS consists of a primary flight display (PFD) and a multifunction display (MFD) on both pilot's and copilot's instrument panels, one sensor display unit (SDU), an integrated avionics processor system (IAPS), one course and heading panel (CHP), two EFIS control panels (ECP), two control display units (CDU), and two EFIS radar panels (ERP).

The EFIS is used to display airplane altitude, airspeed/Mach, vertical speed, air temperature, attitude data, navigational data, flight director commands, mode annunciators, weather, checklists, warnings, and diagnostic messages.

The primary means of determining avionics status is flags and annunciations in the normal EFIS displays. AVIONICS STATUS messages on the MFD indicate possible degraded operation. Use additional means to verify proper system operation.

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the EFIS system.

Refer to the UNS-1C Operator's Manual for a detailed description and operation of the ERP.

EFIS CONTROL Panel

An EFIS control panel is installed on both the pilot's and copilot's instrument panel. Each panel controls its respective EFIS. Each switch is an alternate action switch. On-side selection is indicated by a green annunciation and cross-side or reversionary mode selection is indicated by an amber annunciation.



This switch selects the attitude heading system for the respective EFIS display, autopilot and other systems requiring attitude or heading data. The switch is used to recover attitude and heading data if the on-side AHS fails.

Whenever cross-side AHS data is selected, the pitch, roll, and heading comparators will be disabled, and all equipment normally sourced by the on-side AHS will be sourced by the cross-side AHS.

Avionics System (Cont)



This switch selects the air data system for the respective EFIS display, autopilot and other systems requiring air data. The switch is used to recover air data if the on-side ADC fails.



This switch selects the control display unit and ERP for the respective EFIS display. The switch is used to recover control if the on-side CDU and/or ERP fails.



This switch selects the active transponder system (1 or 2). Transponder 1 is normally controlled by the left radio tuning unit (RTU) and transponder 2 by the right RTU.



This reversionary mode selection switch is used to recover data on the primary flight display. When actuated in the REV mode, the adjacent MFD will assume the functions of the PFD. This would be used if a PFD tube fails.



This switch is used to disable the on-side RTU. In the normal mode, the RTU will control the on-side radios. When switched to the OFF mode, the RTU will blank and all radios will be controlled by the cross-side RTU. This would be used if the on-side RTU fails.

Avionics System

Electronic Flight Instrument System *(Aircraft with Dual UNS-1E FMS)*

The electronic flight instrument system is a Collins 4-tube IDS-850 integrated display system with a single sensor display unit. The EFIS consists of a primary flight display (PFD) and a multifunction display (MFD) on both pilot's and copilot's instrument panels, one sensor display unit (SDU), an integrated avionics processor system (IAPS), one course and heading panel (CHP), two EFIS control panels (ECP), two control display units (CDU), and two EFIS Radar Panels (ERP).

The EFIS is used to display airplane altitude, airspeed/Mach, vertical speed, air temperature, attitude data, navigational data, flight director commands, mode annunciators, weather, checklists, warnings, and diagnostic messages.

The primary means of determining avionics status is flags and annunciations in the normal EFIS displays. AVIONICS STATUS messages on the MFD indicate possible degraded operation. Use additional means to verify proper system operation.

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the EFIS system.

Refer to the UNS-1E Operator's Manual for a detailed description and operation of the (ERP).

EFIS Control Panel

An EFIS control panel is installed on both the pilot's and copilot's instrument panel. Each panel controls its respective EFIS. Each switch is an alternate action switch. On-side selection is indicated by a green annunciation and cross-side or reversionary mode selection is indicated by an amber annunciation.



This switch selects the attitude heading system for the respective EFIS display, autopilot and other systems requiring attitude or heading data. The switch is used to recover attitude and heading data if the on-side AHS fails.

Whenever cross-side AHS data is selected, the pitch, roll, and heading comparators will be disabled, and all equipment normally sourced by the on-side AHS will be sourced by the cross-side AHS.

Avionics System (Cont)



This switch selects the air data system for the respective EFIS display, autopilot and other systems requiring air data. The switch is used to recover air data if the on-side ADC fails.



This switch selects the control display unit and ERP for the respective EFIS display. The switch is used to recover control if the on-side CDU and/or ERP fails.



This switch selects the active transponder system (1 or 2). Transponder 1 is normally controlled by the left radio tuning unit (RTU) and transponder 2 by the right RTU.



This reversionary mode selection switch is used to recover data on the primary flight display. When actuated in the REV mode, the adjacent MFD will assume the functions of the PFD. This would be used if a PFD tube fails.



This switch is used to disable the on-side RTU. In the normal mode, the RTU will control the on-side radios. When switched to the OFF mode, the RTU will blank and all radios will be controlled by the cross-side RTU. This would be used if the on-side RTU fails.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1B FMS

Refer to the UNS-1B Operator's Manual for a detailed description and operation of the flight management system.

UNS-1B remote annunciations indicate the status of the UNS-1B navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1B remote annunciations may be provided on the PFDs. Refer to the UNS-1B Operator's Manual for a detailed description of these annunciations.

NOTE

In some installations, the EFIS may not support UNS-1B annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1B used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1B used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

UNS-1B 405/505 FMS Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MNU-NEXT-RAIM PREDICTION and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button to select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

- Only the most accurate approach (including ILS, LOC, BC, RNAV, GPS, VOR, and NDB) will be shown if more than one approach is available at a specific runway.
- Approaches which include a GPS overlay do not list "GPS" in the title.

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.
   e. On NAV page 1, ensure that the FROM, TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FROM, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1
   a. The FMS will tune the VOR/DME frequencies to the approach facility.
   b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS, LOC, or BC approach is linked into the flight plan*, ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to LOC to fly the approach using conventional guidance and procedures apart from the FMS.
- *If an RNAV approach is linked into the flight plan*, then crossfilled to the other FMS, the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.
- Selecting DTO (Direct-TO) any waypoint on or off the approach will cancel ARM APPR.

5. Select autopilot APPR mode on the FCP to provide proper autopilot sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

6. ● **If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as depicted on the MFD map.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

The aircraft ground speed when crossing the Initial Approach Fix is used to define the procedure turn size. High ground speed at the fix will cause the aircraft to exceed protected airspace.

Avionics System (Cont)

NOTE

VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is active. On some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.

6. ● **If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is active. One some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.

6. ● **If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**
   ■ **Using Autopilot HDG mode to intercept:**
   a. Turn the heading knob to the desired heading.
   b. Depress HDG on the autopilot FCP.
   c. Depress ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
   d. Maneuver the aircraft as desired using the heading bug.
   e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.
- Selecting DTO (Direct-TO) any waypoint on or off the approach cancels the approach.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCEPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.

NOTE

- Failure to select INTCEPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.
- Selecting DTO (Direct-TO) any waypoint on or off the approach cancels the approach.

Avionics System (Cont)

6. ● **If a published holding pattern is required to align the aircraft on approach, use pilot navigation or the following:**
   a. On NAV page 1, depress MNVR, then select HOLDING DEFN.
   b. Define the holding fix, inbound leg, turn direction, leg time, and verify that the suggested entry type is proper.
   c. Highlight ACTIVATE with the cursor, then depress the ACTIVATE key. The aircraft will fly from present position to the holding fix, then execute the specified entry.
   d. When ready to proceed from the holding pattern:
      (1) Select APPR ARM on NAV page 1.
      (2) When inbound to the fix, select ACT APPR on NAV page 1.

NOTE

Do not select APPR ARM followed by DTO (Direct-TO) or PROCEED, because Direct-TO or PROCEED cancels APPR ARM.

7. When FMS APPR mode is activated, the FMS sequences to the final approach course. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 0.3 nm. Full scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

8. VNAV (Vertical Approach Guidance)
   a. Move the altitude preselector to the MDA or missed approach altitude as desired. If it is desirable to keep the preselector at the current aircraft altitude (when level), select autopilot ALT hold mode on the FCP.

NOTE

Autopilot/flight director VNAV (vertical navigation) mode will not arm when the current flight director mode is ALTS captured/tracking. VNAV (VNV) will arm when ALT hold is the current flight director mode. Moving the altitude preselector or depressing the ALT hold mode button on the FCP will change the current flight director mode from ALTS tracking to ALT hold.

b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector or selecting ALT in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or available for capture until the approach is activated. On approaches where APPR automatically activates at the Final Approach Fix, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

- The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.
- If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

Avionics System (Cont)

9. *If a missed approach is required*, depress the GA button in the left throttle, or select MSSD APPR on NAV page 1.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

- FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.
- Missed approach holding patterns are not part of the missed approach data base. Use pilot navigation or holding pattern procedures as discussed earlier.

Multi-Mission Management System (MMMS) (Software Version 505.X only)

The UNS-1B Multi-Mission Management System (MMMS) provides operation for five predefined search patterns. Refer to the UNS-1B operators manual Report No. 2421sv505 for a detailed description of operation.

NOTE

The flight plan map will not be displayed on the EFIS with the search pattern mode active. Only straight line segments of search patterns will be displayed.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2
FMS 1 ①	FMS 2 ①
CDU 1 ①	CDU 2 ①
OSS 1 & GPS 1 ①	OSS 2 & GPS 2 (if installed) ①

① *60-001 thru 60-057 not incorporating SB 60-34-2.*

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1B FMS

Refer to the UNS-1B Operator's Manual for a detailed description and operation of the flight management system.

Program Version 402 and 403

UNS-1B remote annunciations are provided by a set of FMS annunciators installed on each instrument panel. The annunciators indicate the status of the UNS-1B navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1B used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1B used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Program Version 404

UNS-1B remote annunciations are provided on the PFDs. Refer to the UNS-1B Operator's Manual for a detailed description of these annunciations.



In some installations, the EFIS may not support UNS-1B annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel. These annunciators function as described for program versions 402 and 403.

Avionics System (Cont)

Flight Management System (Cont)

UNS-1B 402, 403 and 404 FMS Approach Procedure

1. Depress the EFIS Radar Panel (ERP) NAV button to select FMS as the PFD navigation source.
2. *If the approach type/runway is expected or known*:
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

Only the most accurate approach (including ILS, LOC, BC, RNAV, GPS, VOR, and NDB) will be shown if more than one approach is available at a specific runway.

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.
   e. On NAV page 1, ensure that the FROM, TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FROM, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line.

3. When within 50 nm, select ARM APPR on NAV page 1.
   a. The FMS will tune the VOR/DME frequencies to the approach facility.
   b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 2 nm.

NOTE

If an ILS, LOC, or BC approach is linked into the flight plan, ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to LOC to fly the approach using conventional guidance and procedures apart from the FMS.

NOTE

- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.
- *With 402.X or 403.X software,* selecting DTO (Direct-TO) any waypoint on the approach will prevent the approach (once armed) from automatically activating.

4. Select autopilot APPR mode on the FCP to provide proper autopilot sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNV mode.

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

5. ● **If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as depicted on the MFD Map.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- The aircraft ground speed when crossing the Initial Approach Fix is used to define the procedure turn size. High ground speed at the fix will cause the aircraft to exceed protected airspace.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is active. On some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, use other means (i.e. LVL, CHG, VS, PITCH) to intercept the appropriate vertical profile.

Avionics System (Cont)

Flight Management System (Cont)

5. ●**If the selected approach transition include a DME ARC:**
   a. The FMS will intercept and fly the arc.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- Arc segments are not displayed on EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is active. On some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.

5. ●**If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**
   a. Ensure the autopilot/flight director is in APPR mode (not HDG).
   b. Depress ACT APPR on NAV page 1.
   c. The FMS switches to FMS HDG SEL mode, and the HDG bug initially slews to the current aircraft heading.
   d. Maneuver the aircraft to the desired position and intercept angle using the heading bug with the autopilot/flight director in APPR mode (not HDG).
   e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCEPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.

NOTE

- Failure to select INTCEPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- *With 402.X or 403.X software,* selecting DTO (Direct-TO) any waypoint on the approach will prevent the approach (once armed) from automatically activating.

5. ●**If a published holding pattern is required to align the aircraft on the approach, use pilot navigation, or the following FMS HOLDING PATTERN procedure:**
   a. On NAV page 1, depress MNVR, then select HOLDING DEFN.
   b. Define the holding fix, inbound leg, turn direction, leg time, and verify that the suggested entry type is proper.
   c. Highlight ACTIVATE on the holding definition page with the cursor, the depress ACTIVATE key. The aircraft will fly from present position to the holding fix, then execute the specified entry.
   d. *When ready to proceed from the holding pattern perform one of the following*:
      (1)■Select MNVR on NAV page 1 and depress the PROCEED key. The FMS will complete the current holding pattern and proceed past the holding fix.

      or

      (1)■Select DTO (Direct-TO) the appropriate Approach Fix. The FMS will fly to the selected fix.

      then:

      (2) Select APPR ARM on NAV page 1.

NOTE

Do not select APPR ARM followed by PROCEED, because PROCEED cancels APPR ARM.

      (3) The approach will automatically activate.

NOTE

- *With 402.X or 403.X software,* selecting DTO (Direct-TO) any waypoint on the approach will prevent the approach (once armed) from automatically activating.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is active. On some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, use other means (i.e. LVL, CHG, VS, PITCH) to intercept the appropriate vertical profile.

Avionics System (Cont)

Flight Management System (Cont)

6. When FMS APPR mode is activated, the CDI scaling will change so that full scale lateral (2 dot) course deviation represents 2 nm. Full scale vertical (2 dot) path deviation represents 500 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.
7. VNAV (Vertical Approach Guidance)
   a. Move the altitude preselector to the MDA or missed approach altitude as desired. If it is desirable to keep the preselector at the current aircraft altitude (when level), select autopilot ALT hold mode on the FCP.

NOTE

Autopilot/flight director VNV (vertical navigation) mode will not arm when the current flight director mode is ALTS captured/tracking. VNV will arm when ALT hold is the current flight director mode. Moving the altitude preselector or depressing the ALT hold mode button on the FCP will change the current flight director mode from ALTS tracking to ALT hold.

   b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector or selecting ALT in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or available for capture until the approach is activated. On approaches where APPR automatically activates at the Final Approach Fix, the VNAV guidance will be displayed too late for the autopilot/flight director VNV mode (if armed) to capture the vertical path. In this case, use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

Avionics System (Cont)

Flight Management System (Cont)

8. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

- The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.
- If the altitude preselector is below the aircraft during a VNV descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNV autopilot/flight director mode will no longer be armed or active.

9. *If a missed approach is required*, depress the GA button in the left throttle.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

- FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not pride vertical steering to these altitudes.
- Missed approach holding patterns are not part of the missed approach data base. Use pilot navigation or holding pattern procedures.

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Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2
FMS 1 ①	FMS 2 ①
CDU 1 ①	CDU 2 ①
OSS 1 & GPS 1 ①	OSS 2 & GPS 2 (if installed) ①

① *60-001 thru 60-057 not incorporating SB 60-34-2.*

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual Collins FMS

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the flight management system.

On aircraft not equipped with long range sensors, the FMS requires three (3) DME stations for navigation. The FMS may revert to DR (Dead Reckoning) in areas of sparse DME coverage or while tuning the NAV radios. Selection of autotuning (AUT on the CDU NAV tuning page) will enhance the ability of the FMS to maintain sufficient station coverage for navigation.

When FMS is the selected NAV source, Course Deviation Indicator (CDI) scaling is as follows:

INSTALLED GPS SENSOR	FULL SCALE REPRESENTS: ENROUTE	FULL SCALE REPRESENTS: VOR/DME/RNAV APPROACH
None	10 nm	2 nm
All except CMA 764-2 or Collins GPS 4000	10 nm	2 nm
CMA 764-2 or Collins GPS 4000	5 nm	2 nm

Avionics System (Cont)

Flight Management System (Cont)

Dual Collins FMS Approach Procedure

NOTE

Due to the amount of data that is required to define FMS approaches, it is strongly recommended that the approach waypoints be entered in the flight plan or defined as a route while pilot workload is not an issue.

1. On the CDU FLIGHT PLAN page, depress the line select key for the waypoint prior to the destination airport, and select INSERT WPT AFTER. Enter any appropriate transition terminal waypoints for the approach including any intended Initial Approach Fix that is not aligned with the final approach course. Do not enter the Initial Approach Fix that is on the final approach course.
2. On the CDU FLIGHT PLAN page, depress the line select key next to the destination airport, and delete that waypoint.

NOTE

If the destination airport is the current TO waypoint, this step cannot be accomplished. Either change navigation to a different TO waypoint, or proceed with the remaining steps. Ensure that the proper TO waypoint is established prior to executing the approach.

3. On the CDU FLIGHT PLAN page, at the bottom of the waypoint list, depress the line select key next to ADD WAYPOINTS.
4. ● **If the desired approach is already defined as a route,** enter the applicable ROUTE number.

4. ● **If the desired approach is not yet defined,** use the following steps to define the approach:
   a. Enter the three letter ident of the reference facility used for the approach, and depress enter. Do not select OK after reviewing the coordinates.
   b. Depress ADD RAD/DIS OFFSET instead of the line key next to OK.
   c. From the current approach chart, enter the radial and distance offset for the Initial Approach Fix. Select OFFSET COMPLETE.
   d. Select the line select key next to RNAV APPR in the upper right corner of the CDU screen.
   e. Enter the waypoint name from the approach plate, then select NAME COMPLETE.
   f. Define the radial and distance offset for the next waypoint. Select OFFSET COMPLETE.

NOTE

RNAV approach waypoints can only be defined by radial/offset. They cannot be defined by latitude/longitude coordinates. Only the waypoints defined on the charts with radial/distance offsets can be entered for the RNAV approach. In many cases this means that only the Initial Approach Fix (IAF) and Missed Approach Point (MAP) are defined. During the approach use other means (such as distance to the Missed Approach Point) to identify the Final Approach Fix (FAF).

g. Enter the waypoint name from the approach plate, then select NAME COMPLETE.
h. After the Missed Approach Point is named, depress the line select key next to END RNAV APPR.
i. If desired, enter the missed approach holding fix.

5. Depress the NAV SRC key on the FMS CDU and select FMS as the active navigation source.

NOTE

The FMS is not approved for ILS, LOC, or BC approaches. Waypoints associated with ILS, LOC, and BC approaches may be programmed in the flight plan for display on the map to improve situational awareness, but for these approaches use LOC navigation source on the PFDs.

6. Upon entering the terminal area, or after passing the transition waypoints, use HDG mode as required for the procedure turn or to accommodate assigned heading vectors.
7. Select DIR (Direct-TO) the Initial Approach Fix that is on the final approach course. Use the up/down arrows on the CDU face to select this waypoint from the flight plan.

NOTE

If the waypoint name is manually typed in to the Direct-TO WPT character field, the Direct-TO waypoint will not be linked to the flight plan, and the approach will not be flown. Select the waypoint from the flight plan list using the up/down arrows as required.

Avionics System (Cont)

Flight Management System (Cont)

8. ●**If the resulting DIR (Direct-TO) path from present position to the Initial Approach Fix (IAF) is the desired intercept angle and location,** then select autopilot APPR mode on the Flight Control Panel (FCP).

NOTE

- Lateral deviation scaling is reduced from 10 nm full scale to 2 nm full scale.
- During RNAV approaches automatic leg advance (AUTOLEG) is deselected and unavailable for selection. All RNAV approaches must be flown in SEL CRS or MAN LEG.

8. ●**If a procedure turn, maneuvers, or heading vectors are required:**

a. Depress SYS CTRL on the CDU and select SEL CRS. Rotate the course knob on the course-heading panel to the final approach course. The MFD map will display a solid line to the Initial Approach Fix at an angle equal to the course set by rotating the course knob. A dashed line will extend past the Initial Approach Fix.

NOTE

A SEL CRS value cannot be entered from the scratch pad. Use the course knob to change the SEL CRS value, or depress the line select key next to the displayed value then enter a new value.

b. Once the aircraft has been maneuvered to capture the inbound course at an appropriate position and angle, select autopilot APPR mode. Upon capture of the final approach course, the FMS will turn the aircraft to track the SEL CRS (selected course).

NOTE

- Lateral deviation scaling is reduced from 10 nm full scale to 2 nm full scale.
- During RNAV approaches automatic leg advance (AUTOLEG) is deselected and unavailable for selection. All RNAV approaches must be flown in SEL CRS or MAN LEG.

Avionics System (Cont)

Flight Management System (Cont)

9. Upon reaching the Initial Approach Fix inbound, depress ADV WPT on the CDU FLIGHT PLAN page. The next waypoint will become the TO waypoint.

NOTE

- Failure to select ADV WPT will prevent the FMS from sequencing to the next approach waypoint.
- VNAV is not approved for approaches. Use other means (i.e. preselector, LVL CHG) to descend to the published altitudes as required.

10. Depress ADV WPT as required to sequence past each subsequent waypoint until reaching the Missed Approach Point.
11. *If a missed approach is required,* it may be desirable to withhold from the selecting ADV WPT and to climb on the final approach course (SEL CRS) outbound from the Missed Approach Point until reaching an appropriate procedural altitude.
    a. Climb on course as required.
    b. Select DIR (Direct-TO) the missed approach waypoint if required.

NOTE

If DIR (Direct-TO) is selected while in SEL CRS mode, a new selected course valve will automatically be set to fly from present position to the new waypoint.

    c. *If a holding pattern is required at the Missed Approach Fix:*
        (1) Select autopilot HDG mode on the Flight Control Panel. Select SEL CRS from the CDU SYS CTL page, if required.
        (2) Turn the course knob (SEL CRS) to the inbound course for the holding pattern at the missed approach fix.
        (3) Fly the holding pattern using the HDG bug with the FMS in SEL CRS (SEL CRS value set at inbound course).
    d. Conduct missed approach procedures using the HDG bug with the FMS in SEL CRS.
    e. ● **To discontinue navigating in SEL CRS mode,** depress SYS CTL, then MAN LEG or AUTO LEG as desired. Use DIR (Direct-TO) as required for navigation.
    e. ● **To repeat the approach,** proceed to step 6 above.

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Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
FMS 1	FMS 2
CDU 1	CDU 2
OSS 1 & GPS 1 ①	OSS 2 & GPS 2 (if installed) ①

① *60-004 thru 60-009 not incorporating ECR 3589 or equivalent,* the long range nav sensors are not on the avionics master.

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.



- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Single Collins FMS

Refer to the Collins Pro Line 4 Avionics System for the Learjet 60 Pilot's Guide for a detailed description and operation of the flight management system.

On aircraft not equipped with long range sensors, the FMS requires three (3) DME stations for navigation. The FMS may revert to DR (Dead Reckoning) in areas of sparse DME coverage or while tuning the NAV radios. Selection of autotuning (AUT on the CDU NAV tuning page) will enhance the ability of the FMS to maintain sufficient station coverage for navigation.

When FMS is the selected NAV source, Course Deviation Indicator (CDI) scaling is 10 nm for en route and 2 nm for VOR/DME/RNAV approach.

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Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
FMS 1	CDU 2
CDU 1	
OSS 1 & GPS 1 ①	

① *60-004 thru 60-009 not incorporating ECR 3589 or equivalent,* the long range nav sensors are not on the avionics master.

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1C FMS

Refer to the UNS-1C Operator's Manual for a detailed description and operation of the flight management system.

UNS-1C remote annunciations indicate the status of the UNS-1C navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1C remote annunciations may be provided on the PFDs. Refer to the UNS-1C Operator's Manual for a detailed description of these annunciations.



In some installations, the EFIS may not support UNS-1C annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

Flight Management System (Cont)

UNS-1C FMS Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MENU-NEXT-RAIM PREDICTION and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button and select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

The Jeppesen Extended Data Base contains almost all approaches with the following exceptions:

- If there are multiple VOR and/or NDB approaches to a particular runway, **only** the VOR and/or NDB approaches with the **lowest** landing minimums will be available in the data base.
- If there is a course change at the Final Approach Fix (FAF) of more than 6 degrees, the approach will not be available in the data base.

NOTE

In the Jeppesen Extended Data Base, approaches that include a GPS overlay do not list "GPS" in the title. For example, a "VOR or GPS RWY 11L" approach is displayed in the data base as "VOR 11L" even though it is approved to be flown as a GPS approach. A "GPS-Only" approach such as "GPS RWY 12" is displayed in the data base as "GPS 12".

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.

e. On NAV page 1, ensure that the FROM, TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FROM, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1
   a. The FMS will tune the VOR/DME frequencies to the approach facility.
   b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS, LOC, or BC approach is linked into the flight plan,* ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to VOR/LOC to fly the approach using conventional guidance and procedures apart from the FMS.
- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.
- Selecting DTO (Direct-TO) any waypoint on or off the approach will cancel ARM APPR.

5. Select autopilot APPR mode on the FCP to provide proper autopilot sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

6. ● **If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as noted on the MFD map.
   b. The FMS will automatically sequence to APPR active mode.

WARNING

When crossing the Initial Approach Fix (IAF), aircraft ground speed is used to define the procedure turn size. High ground speed at the IAF will cause the aircraft to exceed protected airspace.

NOTE

VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ● **If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ● **If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**

■ **Using Autopilot HDG mode to intercept:**

a. Turn the heading knob to the desired heading.
b. Depress HDG on the autopilot FCP.
c. Press ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
d. Maneuver the aircraft as desired using the heading bug.
e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.
- Selecting DTO (Direct-TO) any waypoint on or off the approach cancels the approach.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCEPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

- Failure to select INTCEPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.
- Selecting DTO (Direct-TO) any waypoint on or off the approach cancels the approach.

6. ●**If a published holding pattern is required to align the aircraft on approach, use pilot navigation or the following:**
   a. On NAV page 1, depress MNVR, then select HOLDING DEFN.
   b. Define the holding fix, inbound leg, turn direction, leg time, and verify that the suggested entry type is proper.
   c. Highlight ACTIVATE with the cursor, then depress the ACTIVATE key. The aircraft will fly from present position to the holding fix, then execute the specified entry.
   d. When ready to proceed from the holding pattern:
      (1) Select APPR ARM on NAV page 1.
      (2) When inbound to the fix, select ACT APPR on NAV page 1.

NOTE

Do not select APPR ARM followed by DTO (Direct-TO) or PROCEED, because Direct-TO or PROCEED cancels APPR ARM.

7. When FMS APPR mode is activated, the FMS sequences to the final approach course. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 0.3 nm. Full scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

8. VNAV (Vertical Approach Guidance)
   a. Move the altitude preselector to the MDA or missed approach altitude as desired. If it is desirable to keep the preselector at the current aircraft altitude (when level), select autopilot ALT hold mode on the FCP.

NOTE

Autopilot/flight director VNAV (vertical navigation) mode will not arm when the current flight director mode is ALTS captured/tracking. VNAV (VNV) will arm when ALT hold is the current flight director mode. Moving the altitude preselector or depressing the ALT hold mode button on the FCP will change the current flight director mode from ALTS tracking to ALT hold.

b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector or selecting ALT in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or available for capture until the approach is activated. On approaches where APPR automatically activates at the Final Approach Fix, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

9. *If a missed approach is required,* depress the GA button in the left throttle, or select MSSD APPR on NAV page 1.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

- FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.
- Missed approach holding patterns are not part of the missed approach data base. Use pilot navigation or holding pattern procedures as discussed earlier.

Multi-Mission Management System (MMMS) (Software Version 700.X only)

The UNS-1C Multi-Mission Management System (MMMS) provides operation for five predefined search patterns. Refer to the UNS-1C operators manual Report No. 2423sv700 for a detailed description of operation.

NOTE

The flight plan map will not be displayed on the EFIS with the search pattern mode active. Only straight line segments of search patterns will be displayed.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1C FMS

Refer to the UNS-1C Operator's Manual for a detailed description and operation of the flight management system.

UNS-1C remote annunciations indicate the status of the UNS-1C navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1C remote annunciations may be provided on the PFDs. Refer to the UNS-1C Operator's Manual for a detailed description of these annunciations.



In some installations, the EFIS may not support UNS-1C annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

Flight Management System (Cont)

UNS-1C FMS Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MENU-NEXT-RAIM PREDICTION and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button and select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

The Jeppesen Extended Data Base contains almost all approaches with the following exceptions:

- If there are multiple VOR and/or NDB approaches to a particular runway, only the VOR and/or NDB approaches with the lowest landing minimums will be available in the data base.
- If there is a course change at the Final Approach Fix (FAF) of more than 6 degrees, the approach will not be available in the data base.

NOTE

In the Jeppesen Extended Data Base, approaches that include a GPS overlay do not list "GPS" in the title. For example, a "VOR or GPS RWY 11L" approach is displayed in the data base as "VOR 11L" even though it is approved to be flown as a GPS approach. A "GPS-Only" approach such as "GPS RWY 12" is displayed in the data base as "GPS 12".

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.

e. On NAV page 1, ensure that the FROM, TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FROM, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1
   a. The FMS will tune the VOR/DME frequencies to the approach facility.
   b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS, LOC, or BC approach is linked into the flight plan,* ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to VOR/LOC to fly the approach using conventional guidance and procedures apart from the FMS.
- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.

5. Select autopilot APPR mode on the FCP to provide proper autopilot sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

6. ● **If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as noted on the MFD map.
   b. The FMS will automatically sequence to APPR active mode.

WARNING

When crossing the Initial Approach Fix (IAF), aircraft ground speed is used to define the procedure turn size. High ground speed at the IAF will cause the aircraft to exceed protected airspace.

NOTE

VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ● **If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ● **If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**

■ **Using Autopilot HDG mode to intercept:**

a. Turn the heading knob to the desired heading.
b. Depress HDG on the autopilot FCP.
c. Depress ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
d. Maneuver the aircraft as desired using the heading bug.
e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCEPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

- Failure to select INTCEPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.

6. ●**If a published holding pattern is required to align the aircraft on approach, use pilot navigation or the following:**
   a. On NAV page 1, depress MNVR, then select HOLDING DEFN.
   b. Define the holding fix, inbound leg, turn direction, leg time, and verify that the suggested entry type is proper.
   c. Highlight ACTIVATE with the cursor, then depress the ACTIVATE key. The aircraft will fly from present position to the holding fix, then execute the specified entry.
   d. When ready to proceed from the holding pattern:
      (1) Select APPR ARM on NAV page 1.
      (2) When inbound to the fix, select ACT APPR on NAV page 1.
7. When FMS APPR mode is activated, the FMS sequences to the final approach course. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 0.3 nm. Full scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

8. VNAV (Vertical Approach Guidance)
   a. Move the altitude preselector to the MDA or missed approach altitude as desired. If it is desirable to keep the preselector at the current aircraft altitude (when level), select autopilot ALT hold mode on the FCP.

NOTE

Autopilot/flight director VNAV (vertical navigation) mode will not arm when the current flight director mode is ALTS captured/tracking. VNAV (VNV) will arm when ALT hold is the current flight director mode. Moving the altitude preselector or depressing the ALT hold mode button on the FCP will change the current flight director mode from ALTS tracking to ALT hold.

b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector or selecting ALT in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or available for capture until the approach is activated. On approaches where APPR automatically activates at the Final Approach Fix, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

9. *If a missed approach is required,* depress the GA button in the left throttle, or select MSSD APPR on NAV page 1.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

- FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.
- Missed approach holding patterns are not part of the missed approach data base. Use pilot navigation or holding pattern procedures as discussed earlier.

Multi-Mission Management System (MMMS) (Software Version 701.X only)

The UNS-1C Multi-Mission Management System (MMMS) provides operation for five predefined search patterns. Refer to the UNS-1C operators manual Report No. 2423sv701 for a detailed description of operation.

NOTE

The MFD map will display only straight line segments of any flight plan, SID, STAR, search pattern or approach.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1C FMS

Refer to the UNS-1C Operator's Manual for a detailed description and operation of the flight management system.

UNS-1C remote annunciations indicate the status of the UNS-1C navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1C remote annunciations may be provided on the PFDs. Refer to the UNS-1C Operator's Manual for a detailed description of these annunciations.



In some installations, the EFIS may not support UNS-1C annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

Flight Management System (Cont)

UNS-1C FMS Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MENU-RAIM PRED and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button and select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

In the Data Base, GPS overlay approaches can be identified by the addition of a G appended to the approach name. For example, "VOR11L G".

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.

WARNING

It is the pilot's responsibility to verify terrain clearance when proceeding directly to a GPS waypoint.

   e. On NAV page 1, ensure that the FR (from), TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FR, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line. All arc line segments are also depicted as gaps in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1 or system will arm automatically at 30 nm.
   a. The FMS will tune the VOR/DME frequencies to the approach facility.

b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS, LOC, or BC approach is linked into the flight plan,* ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to VOR/LOC to fly the approach using conventional guidance and procedures apart from the FMS.
- Prior to initiating a GPS approach, verify GPS approach integrity exists, the navigation (NAV) source on the PFD is selected to FMS and APPR is selected on the Flight Control Panel (FCP).
- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.

5. Select autopilot APPR mode on the FCP to provide proper autopilot sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

Avionics System (Cont)

Flight Management System (Cont)

6. ●**If the published holding pattern or procedure turn is desired:**
   a. The pilot must select an approach transition on the ARRIVAL page.
   b. The pilot must verify the selected transition includes the desired holding pattern or procedure turn.

WARNING High ground speed may cause the aircraft to exceed protected airspace.

NOTE VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ●**If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ●**If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**
   ■ **Using Autopilot HDG mode to intercept:**
   a. Turn the heading knob to the desired heading.
   b. Depress HDG on the autopilot FCP.
   c. Press ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
   d. Maneuver the aircraft as desired using the heading bug.
   e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCEPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.
f. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- Failure to select INTCEPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.

7. If not already manually activated, the FMS APPR mode will automatically activate approximately 2 nm prior to the Final Approach Fix (FAF). CDI scaling will change so that full scale lateral (2 dot) course deviation represents 0.3 nm. Full scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

Avionics System (Cont)

Flight Management System (Cont)

8. VNAV (Vertical Approach Guidance)
   a. Move the altitude preselector to the MDA or missed approach altitude as desired. If it is desirable to keep the preselector at the current aircraft altitude (when level), select autopilot ALT hold mode on the FCP.

NOTE

Autopilot/flight director VNAV (vertical navigation) mode will not arm when the current flight director mode is ALTS captured/tracking. VNAV (VNV) will arm when ALT hold is the current flight director mode. Moving the altitude preselector or depressing the ALT hold mode button on the FCP will change the current flight director mode from ALTS tracking to ALT hold.

   b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector or selecting ALT in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or be available for capture until the approach is activated. On approaches where APPR automatically activates at the Final Approach Fix, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

- The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.
- If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

9. *If a missed approach is required,* depress the GA button in the left throttle, or select MSSD APPR on NAV page 1.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

- FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.
- Missed approach holding patterns are not part of the missed approach data base. Use pilot navigation or holding pattern procedures as discussed earlier.

Avionics System (Cont)

Flight Management System (Cont)

Multi-Mission Management System (MMMS) (Software Version 702.X only)

The UNS-1C Multi-Mission Management System (MMMS) provides operation for six predefined search patterns. Refer to the UNS-1C operators manual Report No. 2423sv702 for a detailed description of operation.



The MFD map will display only straight line segments of any flight plan, SID, STAR, search pattern or approach.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1C FMS

Refer to the UNS-1C Operator's Manual for a detailed description and operation of the flight management system.

UNS-1C remote annunciations indicate the status of the UNS-1C navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1C remote annunciations may be provided on the PFDs. Refer to the UNS-1C Operator's Manual for a detailed description of these annunciations.



In some installations, the EFIS may not support UNS-1C annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1C used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

Flight Management System (Cont)

UNS-1C FMS Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MENU-RAIM PRED and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button and select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

In the Data Base, GPS overlay approaches can be identified by the addition of a G appended to the approach name. For example, "VOR11L G".

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.

WARNING

It is the pilot's responsibility to verify terrain clearance when proceeding directly to a GPS waypoint.

   e. On NAV page 1, ensure that the FR (from), TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FR, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line. All arc line segments are also depicted as gaps in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1 or system will arm automatically at 30 nm.
   a. The FMS will tune the VOR/DME frequencies to the approach facility.

b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS approach is linked into the flight plan,* ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to LOC to fly the approach using conventional guidance and procedures apart from the FMS.
- Prior to initiating a GPS approach, verify GPS approach integrity exists, the navigation (NAV) source on the PFD is selected to FMS and APPR is selected on the Flight Control Panel (FCP).
- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.
- Selecting DTO (Direct-TO) any waypoint on or off the approach will cancel ARM APPR.

5. Select autopilot APPR mode on the FCP to provide proper autopilot sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

Avionics System (Cont)

Flight Management System (Cont)

6. ●**If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as depicted on the MFD map.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated. On some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.

6. ●**If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated. On some approaches, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.

6. ●**If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**

   ■ **Using Autopilot HDG mode to intercept:**
   a. Turn the heading knob to the desired heading.
   b. Depress HDG on the autopilot FCP.
   c. Depress ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
   d. Maneuver the aircraft as desired using the heading bug.
   e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCEPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.
f. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- Failure to select INTCEPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.
- Selecting DTO (Direct-TO) any waypoint on or off the approach will cancel ARM APPR.

g. If a published holding pattern is required to align the aircraft on approach, use navigation database holding patterns. When ready to proceed from the holding pattern:
   (1) Select APPR ARM on NAV page 1, if not already armed.
   (2) When inbound to the fix, select PROCEED on NAV page 1, or DTO IAF or FAF.

Avionics System (Cont)

Flight Management System (Cont)

7. When FMS APPR mode is activated, the FMS sequences to the final approach course. CDI scaling will change so that full-scale lateral (2 dot) course deviation represents 0.3 nm. Full-scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

8. VNAV (Vertical Approach Guidance)
   a. Move the altitude preselector to the MDA or missed approach altitude as desired. If it is desirable to keep the preselector at the current aircraft altitude (when level), select autopilot ALT hold mode on the FCP.

NOTE

Autopilot/flight director VNAV (vertical navigation) mode will not arm when the current flight director mode is ALTS captured/tracking. VNAV (VNV) will arm when ALT hold is the current flight director mode. Moving the altitude preselector or depressing the ALT hold mode button on the FCP will change the current flight director mode from ALTS tracking to ALT hold.

   b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector or selecting ALT in the previous step; otherwise, VNAV will not capture.

NOTE

VNAV deviation guidance will not be displayed on the PFD, or be available for capture until the approach is activated. On approaches where APPR automatically activates at the Final Approach Fix, the VNAV guidance will be displayed too late for the autopilot/flight director VNAV (VNV) mode (if armed) to capture the vertical path. In this case, when inbound, manually activate the approach prior to reaching the Final Approach Fix in order to provide vertical guidance in time for VNAV (VNV) mode to capture.

NOTE

When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

- The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.
- If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

9. *If a missed approach is required,* depress the GA button in the left throttle, or select MSSD APPR on NAV page 1.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.

Avionics System (Cont)

Flight Management System (Cont)

Frequency Management

Radio tuning may be accomplished via the UNS-1C CDU using the TUNE function. All FMS radio tuning may be manually overridden at any time through the use of Radio Tuning Units (RTU). The avionics that can be FMS tuned include COM 1, COM 2, NAV 1, NAV 2, ADF 1, ADF 2, (if installed), ATC 1 and ATC 2. HF radio tuning must be accomplished manually via the HF radio control head.

NOTE

Depending on FMS software version (604.X or 704.X), when tuning the COMs to an 8.33 kHz spaced frequency with the FMS, the ACT window on the FMS TUNE 1/2 page may show all dashes (---.---).

Multi-Mission Management System (MMMS) (Software Version 704.X only)

The UNS-1C Multi-Mission Management System (MMMS) provides operation for six predefined search patterns. Refer to the UNS-1C operators manual Report No. 2423sv704 for a detailed description of operation.

NOTE

The MFD map will display only straight line segments of any flight plan, SID, STAR, search pattern or approach.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1E FMS

Refer to the UNS-1E Operator's Manual for a detailed description and operation of the flight management system.

UNS-1E remote annunciations indicate the status of the UNS-1E navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1E remote annunciations may be provided on the PFDs. Refer to the UNS-1E Operator's Manual for a detailed description of these annunciations.

NOTE

In some installations, the EFIS may not support UNS-1E annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1E used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1E used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

Flight Management System (Cont)

UNS-1E FMS Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MENU-RAIM PREDICTION and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button and select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

In the Data Base, GPS overlay approaches can be identified by the addition of a G appended to the approach name. For example, "VOR11L G".

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.

WARNING

It is the pilot's responsibility to verify terrain clearance when proceeding directly to a GPS waypoint.

   e. On NAV page 1, ensure that the FR (from), TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FR, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line. All arc line segments are also depicted as gaps in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1 or system will arm automatically at 30 nm.
   a. The FMS will tune the VOR/DME frequencies to the approach facility. The frequency will display on the RTU.

b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS approach is linked into the flight plan,* ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to NAV to fly the approach using conventional guidance and procedures apart from the FMS.
- Prior to initiating a GPS approach, verify GPS approach integrity exists, the navigation (NAV) source on the PFD is selected to FMS and APPR is selected on the Flight Control Panel (FCP).
- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.
- *If a LOC or BC approach is linked into the flight plan,* flight crew must verify tuning of the localizer frequency prior to executing the approach.

5. Select autopilot APPR mode on the FCP to provide proper autopilot/flight director sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

NOTE

The FMS will only depict a procedure turn if an approach transition was defined on the ARRIVAL page. No DME arc will be displayed. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach leg inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

Avionics System (Cont)

Flight Management System (Cont)

6. ●**If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as depicted on the MFD map.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ●**If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ●**If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**

■ **Using Autopilot HDG mode to intercept:**

   a. Turn the heading knob to the desired heading.
   b. Depress HDG on the autopilot FCP.
   c. Depress ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
   d. Maneuver the aircraft as desired using the heading bug.
   e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

- When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.

NOTE

- Failure to select INTCPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.

7. When FMS APPR mode is activated, the FMS sequences to the final approach course. CDI scaling will change so that full-scale lateral (2 dot) course deviation represents 0.3 nm. Full-scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

Avionics System (Cont)
Flight Management System (Cont)

8. VNAV (Vertical Approach Guidance)
   a. After level-off at the initial approach altitude move the altitude preselector to the MDA.

CAUTION

If ALT is manually engaged, the Autpilot/flight director will *not* capture. Manual deviation will be displayed.

   b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or be available for capture until the approach is activated.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

   c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

NOTE

- The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle. No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.
- If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot/flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

Avionics System (Cont)

Flight Management System (Cont)

9. *If a missed approach is required,* depress the GA button in the left throttle, or select MISSD APPR on NAV page 1.
   a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
   b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
   c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.

Avionics System (Cont)

Flight Management System (Cont)

Frequency Management

Radio tuning may be accomplished via the UNS-1E CDU using the TUNE function. All FMS radio tuning may be manually overridden at any time through the use of Radio Tuning Units (RTU). The avionics that can be FMS tuned include COM 1, COM 2, NAV 1, NAV 2, ADF 1, ADF 2 (if installed), ATC 1 and ATC 2. HF radio tuning must be accomplished manually via the HF radio control head.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Avionics System (Cont)

Flight Management System

The FMS provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

Dual UNS-1E FMS

Refer to the UNS-1E Operator's Manual for a detailed description and operation of the flight management system.

UNS-1E remote annunciations indicate the status of the UNS-1E navigation modes. These annunciators are not intended to reflect the status of the on-side FMS; they reflect the status of the FMS in use as the on-side navigation source. If the cross-side FMS is being used as the navigation source, these annunciators will show the status of the cross-side FMS.

UNS-1E remote annunciations may be provided on the PFDs. Refer to the UNS-1E Operator's Manual for a detailed description of these annunciations.

NOTE

In some installations, the EFIS may not support UNS-1E annunciations on the PFDs. These installations will have remote annunciators installed on the instrument panel.



FMS HDG (Heading) will illuminate whenever the heading mode has been selected on the UNS-1E used as the NAV source for the on-side EFIS. When FMS HDG is illuminated, the FMS steering outputs are referenced to a CDU selected heading rather than the active FR-TO Nav leg.

APRCH (Approach) will illuminate whenever the approach mode has been selected on the UNS-1E used as the NAV source for the on-side EFIS.



SXTK (Selected Crosstrack) will illuminate to remind the crew that a parallel course has been selected for the current navigation leg.

Avionics System (Cont)

Flight Management System (Cont)

Dual UNS-1E sv 802 Approach Procedure

1. *If a GPS approach is expected at the destination,* select FPL-MENU-RAIM PREDICTION and enter the arrival time (if required). An availability of APPR at the time of arrival indicates adequate GPS integrity monitoring for approaches.
2. Depress the EFIS Radar Panel (ERP) NAV button and select FMS as the PFD navigation source.
3. *If the approach type/runway is expected or known:*
   a. Depress the FPL-MENU-ARRIVE keys to display the arrivals page.
   b. Ensure the destination airport on the arrival page is proper.
   c. Select the runway, STAR (if required), approach type, and transition (if applicable).

NOTE

In the Data Base, GPS overlay approaches can be identified by the addition of a G appended to the approach name. For example, "VOR11L G".

   d. A *NO LINK* is automatically inserted in the flight plan when a STAR or Approach is added and the end point of one procedure does not exactly match the beginning point of the next procedure. Select FPL and delete the *NO LINK* as required.

WARNING

It is the pilot's responsibility to verify terrain clearance when proceeding directly to a GPS waypoint.

   e. On NAV page 1, ensure that the FR (from), TO, and NX (next) navigation legs accurately depict the desired flight plan. Change the FR, TO, NX legs or select DTO (Direct-TO) as required to link the current navigation leg to the flight plan.

NOTE

The MFD Map displays the selected STAR, approach waypoints, and the missed approach fix. A *NO LINK* is depicted as a gap in the course line. All arc line segments in the course line are also depicted as gaps in the course line.

4. When within 50 nm, select ARM APPR on NAV page 1 or system will arm automatically at 30 nm.
   a. The FMS will tune the VOR/DME frequencies to the approach facility. The frequency will display on the RTU.

b. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 1 nm. Full scale vertical (2 dot) path deviation represents 500 feet. TERM is annunciated on the PFD to indicate terminal scaling.

NOTE

- *If an ILS approach is linked into the flight plan,* ARM APPR is not available. The waypoints will be displayed on the map and the FMS will use enroute leg sequencing. FMS vertical navigation will not be provided. Change the navigation source to NAV to fly the approach using conventional guidance and procedures apart from the FMS.
- Prior to initiating a GPS approach, verify GPS approach integrity exists, the navigation (NAV) source on the PFD is selected to FMS and APPR is selected on the Flight Control Panel (FCP).
- *If an RNAV approach is linked into the flight plan, then crossfilled to the other FMS,* the ARM APPR selection may not be immediately available on the crossfilled FMS due to a delay in DME tuning on that side.
- *If a LOC or BC approach is linked into the flight plan,* flight crew must verify tuning of the localizer frequency prior to executing the approach.

5. Select autopilot APPR mode on the FCP to provide proper autopilot/flight director sensitivity for the approach, and to allow eventual subsequent selection of autopilot VNAV (VNV) mode.

NOTE

A procedure turn will only be depicted and flown if an approach transition was defined on the ARRIVAL page. No DME arc will be displayed. If no approach transition is selected or available, the FMS will sequence to the Inbound Approach leg using normal turn anticipation, which may result in intercepting the Inbound Approach Course inside the Final Approach Fix. To prevent this, use pilot navigation prior to reaching the Initial Approach Fix to establish a proper intercept of the Inbound Approach course.

Avionics System (Cont)

Flight Management System (Cont)

6. ●**If the selected approach transition includes a procedure turn:**
   a. The FMS will fly the procedure turn as depicted on the MFD map.
   b. The FMS will automatically sequence to APPR active mode.

WARNING

When crossing the Initial Approach Fix (IAF), aircraft ground speed is used to define the procedure turn size. High ground speed at the IAF will cause the aircraft to exceed protected airspace.

NOTE

VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ●**If the selected approach transition includes a DME ARC:**
   a. The FMS will intercept and fly the ARC.
   b. The FMS will automatically sequence to APPR active mode.

NOTE

- ARC segments are not displayed on the EFIS. The arc start and end points are displayed.
- VNAV deviation guidance will not be displayed on the PFD or be available for capture until the approach is activated.

6. ●**If using pilot navigation or when given vectors to intercept the Inbound Approach Course:**
   ■ **Using Autopilot HDG mode to intercept:**
   a. Turn the heading knob to the desired heading.
   b. Depress HDG on the autopilot FCP.
   c. Depress ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the autopilot will remain in HDG mode.
   d. Maneuver the aircraft as desired using the heading bug.
   e. When cleared for the approach, (re)select APPR on the autopilot FCP.

NOTE

When ACT APPR has been manually selected, the FMS will calculate a 45° intercept for the inbound course, if required. Ensure the aircraft is properly positioned so as to intercept the inbound course outside the Final Approach Fix before coupling the flight director/autopilot to the FMS.

NOTE

The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map.

■ **Using FMS HDG SEL function to intercept:**

a. On the FMS NAV page 1, select the HDG key and accept the desired HDG. The heading bug will slew to the accepted value.
b. The FMS will annunciate HDG SEL mode, and will follow the PFD heading bug.
c. Select ACT APPR on NAV page 1. This will change the course deviation to the inbound course, but the FMS will remain in HDG SEL mode.
d. Maneuver the aircraft to the desired position and intercept angle using the heading bug.
e. When cleared for the approach, and the aircraft is positioned for intercept, select INTCPT on FMS NAV page 1. The FMS will annunciate HDG INT mode.

NOTE

- Failure to select INTCPT will cause the aircraft to fly through the inbound course with the FMS remaining in HDG SEL mode.
- The FMS places a waypoint symbol labeled INBOUND at the aircraft position on the MFD Map at the point ACT APPR is manually selected.

7. *For aircraft equipped with sv 802.0 to 802.4* — When flying approaches that have a course reversal in which the Holding Fix (HF) is co-located with the Final Approach Fix (FAF), remove all *NO LINK* and *GAP* entries that appear prior to the FAF on the FPL page prior to 5 nm of the FAF.

WARNING

If the *NO LINK* and *GAP* entries that appear **prior** to the FAF on the FPL page are not deleted the FMS may lock up while sequencing the approach mode. A red CDU DATA BUS FAIL message will post. The flight director lateral mode will erroneously indicate FMS (although the FMS is not outputting steering commands). HSI course deviation, map presentation and distance to waypoint will be frozen. A power down/power up reboot will be required to resume FMS operation. An alternate means of navigation will be required until FMS navigation is available.

Avionics System (Cont)

Flight Management System (Cont)

NOTE

NO LINK entries that appear below the FAF on the FPL page should not be deleted.

8. When FMS APPR mode is activated, the FMS sequences to the final approach course. CDI scaling will change so that full scale lateral (2 dot) course deviation represents 0.3 nm. Full scale vertical (2 dot) path deviation represents 200 feet. APPR is annunciated on the PFD to indicate the FMS is in approach mode.

NOTE

Because of the expanded scale sensitivity, in approach mode, lateral course deviation differences may be noticed between the pilot's and copilot's HSI course presentations when using independent FMS navigation sources.

9. VNAV (Vertical Approach Guidance)
   a. After level-off at the initial approach altitude move the altitude preselector to the MDA.

CAUTION

If ALT is manually engaged, the autopilot/flight director will not capture. Manual deviation will be displayed.

   b. Select VNAV on the FCP to arm vertical navigation. This step must be accomplished after moving the preselector in the previous step; otherwise, VNAV will not capture.

NOTE

- VNAV deviation guidance will not be displayed on the PFD, or available for capture until the approach is activated.
- When the Initial Approach Fix and the Missed Approach Point are co-located, such as commonly found on approaches where the facility is near the runway, the aircraft will likely be above VNAV guidance after establishing inbound. Use other means (i.e. LVL CHG, VS, PITCH) to descend to the appropriate vertical profile.

   c. If armed, VNV mode will capture when the vertical deviation is stabilized and centered.

WARNING

No FMS vertical navigation level off is provided at the MDA. It is the pilot's responsibility to level off at the MDA or go around as required.

NOTE

- The FMS provides vertical steering from the Final Approach Fix to the runway threshold crossing height at a stable, constant angle.
- If the altitude preselector is below the aircraft during a VNAV (VNV) descent, the autopilot / flight director will capture ALTS mode and track the preselect altitude. The vertical path deviation will continue to be displayed on the PFD, but the VNAV (VNV) autopilot/flight director mode will no longer be armed or active.

10. *If a missed approach is required,* depress the GA button in the left throttle, or select MISSD APPR on NAV page 1.
    a. FMS NAV may be re-engaged on the autopilot/flight director for lateral steering after selecting GA, if desired.
    b. The FMS will continue to provide lateral steering to the published missed approach point, then will sequence to the missed approach leg.
    c. Appropriate heading to altitude labels, or course to altitude procedural legs will be depicted on the MFD map after sequencing past the missed approach point.

NOTE

FMS vertical steering is not provided for missed approach procedures. Altitudes associated with the missed approach procedural leg transitions will be depicted on the MFD Map, but the FMS does not provide vertical steering to these altitudes.

Avionics System (Cont)

Flight Management System (Cont)

Frequency Management

Radio tuning may be accomplished via the UNS-1E CDU. All FMS radio tuning may be manually overridden at any time through the use of the Radio Tuning Units (RTU). The avionics that can be FMS tuned include COM 1, COM 2, NAV 1 NAV 2, ADF 1, ADF 2 (if installed) and transponder (ATC). HF radio tuning must be accomplished manually via the HF control head.

Avionics System (Cont)

Avionics Master Switch

Two Avionics Master Switches are installed which allow the crew to turn groups of avionics equipment off and on through the use of two switches. The LEFT MASTER Switch is installed on the pilot's switch panel and RIGHT MASTER Switch is installed on the copilot's switch panel.

The equipment controlled by the Avionics Master Switches is shown in the following list:

LEFT MASTER	RIGHT MASTER
ADF 1	COMM 2
NAV 1	NAV 2
DME 1	DME 2
ATC Transponder 1	ATC Transponder 2
PFD 1	PFD 2
MFD 1	MFD 2
AAP 1	AAP 2
FD 1 (AP/YD/RB)	FD 2 (AP/YD/RB)
IAPS TEMP Control 1	IAPS TEMP Control 2
HF 1	RTU 2
SELCAL	Cabin Display
Radio Altimeter	Radar
ERP 1	ERP 2

Additional equipment may be controlled by the Avionics Master Switches as a result of optional equipment installations.

NOTE

- VHF COMM 1 is not controlled by the Avionics Master Switches.
- Both Avionics Master Switches must be on for the autopilot, yaw damper and rudder boost to be operative.

Avionics System (Cont)

Integrated Standby Indicator System *(Aircraft 60-249 & Subsequent)*

The Integrated Standby Indicator System (ISIS) combines the function of an attitude indicator, an airspeed indicator and an altimeter into a single indicator. The indicator will also display localizer and glideslope deviation whenever NAV 1 is tuned to a localizer frequency.

NOTE

The course deviation indicator does not automatically reverse when flying a localizer back-course approach.

The self-contained unit incorporates an electronic display, a solid state attitude sensor, and an air data computer (with static source error correction). Pitot and static inputs are supplied from the standby pitot-static probe. Electrical power is supplied from EMER BAT 1.

The VMO/MMO limit is indicated with red on the airspeed tape. When VMO/MMO is exceeded, the Mach and airspeed readout background color changes from black to red. However, the ISIS does not trigger an aural overspeed warning. A red tick mark is displayed just to the right of the airspeed tape. This mark indicates the Mach trim inoperative (with autopilot disengaged) MMO.

Unlike the primary flight displays, the ISIS does not display red chevrons to indicate excessive pitch attitude.

Refer to the *pilots guide for the Smiths Industries Integrated Standby Indicator System (ISIS) Part Number 314MFD1-1* for a detailed description and operation of the ISIS.

Power Up

When EMER BAT 1 is switched on, the ISIS will perform a self test followed by an align procedure. The self test requires approximately 10 seconds and the align procedure requires approximately 60 seconds. When the align procedure is complete, the ISIS enters its normal operating mode.

NOTE

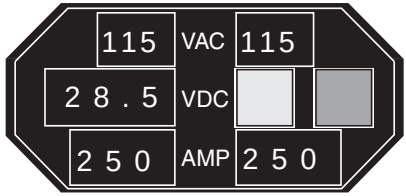
Do not move the aircraft during the align procedure.

In-Flight Align Procedure

1. Establish aircraft in straight and level, unaccelerated flight.
2. ALIGN Button — Depress and release. Do not hold for more than 3 seconds. Alignment should occur in approximately 10 seconds.

Electric Power Monitor

An electric power monitor is installed which monitors left and right AC bus voltage, left and right DC generator load and the DC charging bus voltage. Digital displays are used for voltage and amperage readouts.



Each parameter being monitored is divided into ranges as follows:

• Normal • Caution • Warning

Whenever any parameter goes from the normal range to the caution range, the indicator's amber light and affected parameter will flash. If the parameter progresses into the warning range, the indicator's red light and affected parameter will flash. The amber ELEC PWR light (annunciator panel) will illuminate (steady or flashing) anytime an amber or red light on the indicator is illuminated (steady or flashing). Whenever any parameter goes into the caution range, the Master CAUT lights will flash. Whenever any parameter goes into the warning range, the Master WARN lights will flash. Depressing the amber or red light or either Master CAUT/WARN light will cancel the flashing of amber cautions and red warnings, the affected parameter and the amber ELEC PWR light. The amber or red light will remain illuminated (steady) until the affected parameter returns to the normal range.

A malfunction which affects the accuracy of the indicator will cause EE.E to be displayed in the VDC readout and dashes "-" in all other readouts.

Whenever the left and right inverters are out-of-phase, a "C" will flash in the least significant digit of each VAC display.

Caution and warning annunciations are inhibited during starter engagement.

Engine Systems

Automatic Performance Reserve (APR)

The APR system provides for an automatic change in thrust (from take-off N_1 rating to APR rating) from the operative engine in the event of loss of thrust from one engine during takeoff. The system consists of an APR switch on the forward pedestal, APR ARM and APR ON lights on the glareshield. To detect loss of thrust, the Full Authority Digital Engine Control (FADEC) continuously monitors the opposite engine's N_1 and N_2 signals.

APR system operation is pilot controlled through the APR ARM-OFF switch. For automatic operation the switch is set to ARM. When ARM is selected, the green APR ARM light will illuminate provided no faults exist which affect the APR function. When a loss of thrust is detected by one of the FADECs, a change in thrust from the operative engine is commanded. The FADEC checks that the change to the appropriate APR N_1 setting has been triggered and if it has, the amber APR ON light will illuminate. Should automatic activation of APR fail to occur, APR can be manually activated by setting the thrust lever to the APR detent. Once invoked, the APR thrust schedule will remain activated until the APR switch is set to OFF returning the thrust schedule to normal.

Engine Systems (Cont)

Engine Synchronizer

Engine synchronization is provided by the Full Authority Digital Engine Control (FADEC). Additional components include two ENG SYNC switches below the thrust levers and an amber ENG SYNC light on the glareshield annunciator panel. During flight, the engine synchronizer, if selected, will maintain the left and right engine N1 or N2 in sync with each other. When the ENG SYNC switch is set to SYNC, the N1 indicator compensation will be removed; therefore, the N1 and N1 bug presentations will reflect actual N1 speed. The engine synchronizer must not be used during takeoff, landing or during single-engine operations.

The amber ENG SYNC light will be illuminated whenever the nose gear is not up and the ENG SYNC switch is in the SYNC position.

Automatic engine synchronization can be utilized whenever the ENG SYNC SYNC-OFF switch is set to SYNC, the Thrust Lever Angle (TLA) of each engine is in or below the MCT detent, and the difference between the left and right N1 is equal to or less than 5%. The system will not drive the engine below idle or above MCT.

To obtain automatic engine synchronization:

1. Thrust Levers — As required to manually sync engines' N1 to within 5% in the IDLE to MCT range.
2. ENG SYNC Selector Switch (pedestal) — N1 or N2 as desired.
3. ENG SYNC SYNC-OFF Switch (pedestal) — SYNC.

Environmental Systems

Bleed Air Heating and Cooling

Cabin and crew air is provided by cooling engine bleed air in a ram air heat exchanger. Primary heating and cooling is obtained by controlling the amount of warm air that goes through the heat exchanger by modulating the cabin or crew temperature control valve. Temperature control valve position is indicated on the TEMP CONT CREW and TEMP CONT CAB indicator on the instrument panel.

An amber DUCT OV HT light is installed on the glareshield annunciator panel to alert the crew that a duct temperature limiter in either the cabin or crew tailcone ducting has sensed an overheat condition and will close the affected temperature control valve as required to maintain duct temperature within limits. The DUCT OV HT light will extinguish when satisfactory duct temperature is regained.

1. BLEED AIR Switches — ON.
2. CAB AIR Switch — ON.

NOTE

With the aircraft sitting statically on the ground, do not perform extended engine operation above IDLE with CAB AIR Switch ON. There is no ram airflow through the heat exchanger and possible damage to air conditioning components may occur.

3. CABIN or CREW Climate Controls — Operate as follows:

NOTE

The CAB TEMP indicator can be used to assist the crew in maintaining a comfortable cabin temperature.

a. ●**For Crew Temp,** AUTO-MAN Switch — AUTO.

a. ●**For Cabin Temp,** AUTO-CABIN-MAN Switch — AUTO or CABIN.

NOTE

With switch in AUTO, the instrument panel mounted CABIN COLD-HOT knob will control the cabin temperature. With switch in CABIN, the temperature selector, located in the cabin, will control the cabin temperature.

b. COLD-HOT Knob — Rotate to desired cabin temperature. In flight the cabin and crew temperature control system will automatically maintain the cabin and cockpit at the desired temperature.

Environmental Systems (Cont)

Bleed Air Heating and Cooling (Cont)

If satisfactory cabin temperature is not maintained:

c. AUTO-MAN or AUTO-CABIN-MAN Switch — MAN.
d. COLD-HOT Knob — Rotate to desired setting.

Additional Cooling

NOTE

- On the ground, power to the cooling system must be supplied by an engine generator, a GPU or an APU (if installed). In flight, both generators must be on-line (GEN lights out) to power the cooling system.
- The cooling system is inoperative when the STAB WING HEAT switch is in the On position.
- With the COOL switch in the COOL position, the cooling system will automatically shut down when the TEMP CONT CAB indicator needle moves toward HOT from the full COLD position.
- Power to the cooling system will be lost if the fault isolator circuit trips. If the fault clears, power can be restored by cycling the COOL switch to OFF and back to COOL.
- The cabin overhead eyeball outlets provide cool air from the crew fan.

Ground Operation:

1. One generator, a GPU or an APU (if installed) on-line.
2. TEMP CONT CAB Indicator — COLD.
3. CAB AIR Switch — OFF.
4. COOL Switch — COOL.
5. CREW FAN Control — Rotate to desired setting.
6. CABIN FAN Control — Rotate to desired setting.

Inflight Operation:

1. Both generators on-line (GEN lights out).
2. TEMP CONT CAB Indicator — COLD.
3. COOL Switch — COOL.
4. CREW FAN Control — Rotate to desired setting.
5. CABIN FAN Control — Rotate to desired setting.

Environmental Systems (Cont)

Additional Heating

NOTE

- On the ground, power to operate the auxiliary heater and cockpit floorboard heaters must be supplied by an engine generator, a GPU or an APU (if installed).
- In flight, both generators must be on-line (GEN lights out) to power the cockpit floorboard heaters (CREW AUX HT).
- Cabin AUX HT is inoperative when the CAB AIR switch is set to ON.

Cockpit *(60-067 & Subsequent and prior aircraft when SB 60-21-5 has been accomplished)*

Ground Operation:

1. One generator, a GPU or an APU (if installed) on-line.
2. AUX HT Switch — CREW or CAB & CREW.

Inflight Operation:

1. Both generators on-line (GEN lights out).
2. AUX HT Switch — CREW or CAB & CREW.

Cabin *(60-045 & Subsequent and prior aircraft when ECR 3771 or SB 60-21-4 has been accomplished)*

Ground Operation:

1. One generator, a GPU or an APU (if installed) on-line.
2. CAB AIR Switch — OFF.
3. AUX HT Switch — CAB & CREW.
4. CABIN FAN Control — Rotate to desired setting.

Environmental Systems (Cont)

Additional Air Circulation

Ground Operation:

NOTE

- Use of a GPU or an APU is recommended to prevent draining the batteries.
- *On aircraft 60-001 thru 60-044 when ECR 3771 or SB 60-21-4 has not been accomplished* — If power is not supplied by an engine generator, a GPU or an APU (if installed), the cabin fan will operate on low speed only. *On aircraft 60-045 & Subsequent and prior aircraft when ECR 3771 or SB 60-21-4 has been accomplished* — If power is not supplied by an engine generator, a GPU or an APU (if installed), the cabin fan will not operate.

1. CAB AIR Switch — OFF.
2. CABIN FAN Control — Rotate to desired setting.
3. CREW FAN Control — Rotate to desired setting.
4. Adjust cockpit and cabin overhead eyeball outlets as desired.

NOTE

The cabin overhead eyeball outlets provide air circulation with the CREW FAN on.

Inflight Operation:

1. CABIN FAN Control — Rotate to desired setting.
2. CREW FAN Control — Rotate to desired setting.
3. Adjust cockpit and cabin overhead eyeball outlets as desired.

NOTE

The cabin overhead eyeball outlets provide air circulation with the CREW FAN on.

Environmental Systems (Cont)

Oxygen System

WARNING Smoking is prohibited while oxygen system is in use.

Oxygen Duration

Figure 4-2, in Section IV, shows oxygen supply duration of a fully charged system as a function of cabin altitude and number of occupants using the system. Passenger durations above 30,000 feet cabin altitude are provided for information only. Prior to extended overwater flights, plan oxygen requirements to provide sufficient oxygen for all occupants in the event of a pressurization failure. Additional oxygen may be required to assure that both oxygen duration and range (fuel) requirements are satisfied.

A fully charged oxygen bottle is serviced to approximately 1850 psi at a specified temperature. The indicated oxygen pressure may drop as the oxygen bottle cold soaks. The amount of pressure drop may be a few hundred psi. This drop in pressure has no effect on the amount of oxygen available, since the oxygen is warmed back up as it enters the cabin.

Passenger Oxygen

WARNING

- Passenger masks are intended for use during an emergency descent to an altitude not requiring supplemental oxygen.
- Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended.

1. With the PASSENGER OXYGEN valve in the OFF position, no oxygen is supplied to the cabin.
2. With the PASSENGER OXYGEN valve in the AUTO position, oxygen is available to the passenger oxygen distribution system and the passenger oxygen masks will drop from their storage compartments if the cabin altitude reaches 14,500 feet. Whenever the oxygen masks deploy, the overhead lights will illuminate to provide maximum visibility for donning masks. The passengers must don the masks and pull the attached lanyards to start the flow of oxygen.

NOTE If GEN and BATTERY switches are OFF, automatic presentation of masks will not occur. In this event, turn PASSENGER OXYGEN valve to DEPLOY if passenger oxygen is required.

Environmental Systems (Cont)

Passenger Oxygen (Cont)

3. With the PASSENGER OXYGEN valve in the DEPLOY position, the passenger oxygen masks will drop from their storage compartments. The passengers must don the masks and pull the attached lanyards to start the flow of oxygen. This should be used if automatic presentation of the masks does not occur.
4. Deploy passenger oxygen if pressurization irregularities are encountered above 10,000 feet MSL.

NOTE

The rebreather bag may not inflate even though oxygen is flowing. This is normal.

Crew Oxygen (EROS Crew Masks)

1. If oxygen is required by the crew only, PASSENGER OXYGEN Valve — OFF.
2. When oxygen masks are worn by the crew, NORM MIC/OXY MIC Switches — OXY MIC. The interphone function of the audio control system will be active allowing communication between crew members.

Preflight

1. ● **On aircraft utilizing a mask stowage box,** Depress the PRESS TO TEST lever on the mask stowage box. Oxygen will flow for a short period of time. Flow will be shown on the flow indicator.

1. ● **On aircraft utilizing a mask stowage cup:**
   a. Press the red control knob on the bottom of regulator and verify oxygen flow. An inline pressure detector will show green when oxygen pressure is available to the mask.
   b. Push the N-100% red control lever to 100%.
   c. *If an adjustable crew mask is installed,* set the black adjustable harness toggle to NORM and turn the roller control up to MAX.

Operation

1. Remove hats and "ear muff" type headsets.

NOTE

Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

2. Remove mask from stowage box or cup.
3. Squeeze and hold the red levers on the mask pressure regulator together to inflate the pneumatic harness for donning.
4. Position harness over the head, position mask as desired, then release red levers.

Environmental Systems (Cont)

Crew Oxygen (EROS Crew Masks) (Cont)

5. Release the thumb or forefinger from the red inflation control lever to deflate the harness. Guide the mask into position on the face.
6. Ensure that mask is properly sealed. Reposition mask if required.

NOTE

Beards worn by crew members may make proper sealing of the mask more difficult.

7. *On aircraft utilizing a mask stowage box,* oxygen flow is shown on the flow indicator at the upper left corner of the mask stowage box.
8. With the 100% lever extended and the PRESS TO TEST button/knob rotated to the ◡ position, the mask will deliver automatic oxygen dilution from S.L. to 30,000 feet cabin altitude, 100% oxygen above 30,000 feet cabin altitude, and automatic pressure breathing above approximately 37,000 feet cabin altitude.
9. To obtain 100% oxygen at any time, depress 100% lever on mask pressure regulator.
10. For emergency operation (positive pressure breathing), push the red N100% lever to 100% and turn the control knob on the bottom of the regulator to EMERGENCY (rotate PRESS TO TEST button/knob to ●). With the mask pressure regulator controls in this position the crew mask will deliver 100% oxygen at all cabin altitudes and maintain a positive pressure in the mask cup at all times for respiratory protection from smoke or fumes.

Donning Smoke Goggles (if required)

1. Smoke Goggles — Don.
2. Open the vent valve on top of the oxygen mask by pulling the slide down. This will provide oxygen flow to the goggles to purge smoke and gases and to prevent lens from fogging.
3. Turn the control knob on bottom of regulator to EMERGENCY.

Adjusting Mask

1. After the harness has deflated, depress the inflation control lever to partially inflate the harness until the mask can be easily moved.
2. Adjust the mask for optimum fit and release the inflation control lever.

Environmental Systems (Cont)

Crew Oxygen (EROS Crew Masks) (Cont)

Adjusting Harness Tension (if applicable)

1. Switch the toggle to COMF.
2. Turn the roller control up to MAX.
3. Depress the inflation control lever to slowly inflate the harness.
4. Release the inflation control lever when a comfortable mask tension is achieved.
5. Rotate the roller control down to reduce the harness residual pressure.
6. To relax the harness and readjust the mask, depress the inflation control lever to obtain a comfortable setting.

Emergency with Toggle in COMF Position (if applicable)

1. If an emergency occurs while the harness is relaxed, switch the toggle back to NORM. The harness will immediately deflate and apply full tension to the head.

Mask Removal

1. Switch the toggle to NORM (if applicable).
2. Depress the red inflation control lever to inflate the harness.
3. Remove the mask and harness while depressing the inflation control lever.

Crew Oxygen (Puritan Bennett Sweep-On 2000 Crew Masks)

1. If oxygen is required by the crew only, PASSENGER OXYGEN Valve — OFF.
2. When oxygen masks are worn by the crew, NORM MIC/OXY MIC Switches — OXY MIC. The interphone function of the audio control system will be active allowing communication between crew members.

Preflight

1. ● **On aircraft utilizing a mask stowage box,** Depress the PRESS TO TEST lever on the mask stowage box. Oxygen will flow for a short period of time. Flow will be shown on the flow indicator blinker.
1. ● **On aircraft utilizing a mask stowage cup,** Observe inline pressure indicator is green or rotate mask regulator knob to the EMER position and note oxygen flow. Reset to 100% position.

Environmental Systems (Cont)

Crew Oxygen (Puritan Bennett Sweep-On 2000 Crew Masks) (Cont)

Operation

1. Remove hats and "ear muff" type headsets.

NOTE

Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

2. Remove mask from stowage box or cup.
3. Squeeze and hold the red lever on the mask pressure regulator to inflate the pneumatic harness for donning.
4. Position harness over the head, position mask as desired, then release the red lever.
5. Ensure that mask is properly sealed. Reposition mask if required.

NOTE

Beards worn by crew members may make proper sealing of the mask more difficult.

6. *On aircraft utilizing a mask stowage box,* oxygen flow is shown on the flow indicator at the upper left corner of the mask stowage box.
7. With the regulator set to NORM, the mask will deliver automatic oxygen dilution from S.L. to 33,000 feet cabin altitude, 100% oxygen above 33,000 feet cabin altitude, and automatic pressure breathing above approximately 39,000 feet cabin altitude.
8. To obtain 100% oxygen at any time, rotate the regulator knob to 100%.
9. For emergency operation (positive pressure breathing), turn the control knob to EMER. With the mask pressure regulator knob in this position, the crew mask will deliver 100% oxygen at all cabin altitudes and maintain a positive pressure in the mask cup at all times for respiratory protection from smoke or fumes.

Donning Smoke Goggles (if required)

1. Smoke Goggles — Don. A purge valve will automatically bias open.
2. Turn the control knob to EMER.

Mask Removal

1. Depress and hold the red inflation control lever until the harness fully inflates.
2. Remove the mask and release the red inflation control lever.

Environmental Systems (Cont)

Pressurization System

The pressurization system can be operated in either automatic or manual mode. When automatic mode is selected, the system uses data provided by the aircraft's air data system, crew input, and various discrete signals to automatically control the cabin pressurization during climb, cruise and descent. When manual mode is selected, the crew maintains cabin pressurization with the MAN ALT Control.

60-049 & Subsequent and prior aircraft when SB 60-21-3 has been accomplished, the pressurization system (in automatic mode) provides the capability to operate at high-altitude fields (8,000 - 13,700 ft elevation) without triggering annunciations and emergency pressurization. The logic employed for this feature is as follows:

Conditions	Pressurization system will:
TAKEOFF	
Takeoff from field elevation less than 8000 ft	• Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 8600 feet. • Activate emergency pressurization if cabin altitude exceeds 9500 feet. • Activate cabin altitude warning horn if cabin altitude exceeds 10,100 feet. • *On aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2,* activate red CABIN ALT HI light if cabin altitude exceeds 10,100 feet.
Takeoff from field elevation greater than 8000 ft	• Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 14,500 feet. • Activate emergency pressurization if cabin altitude exceeds 14,500 feet. • Activate cabin altitude warning horn if cabin altitude exceeds 14,500 feet. • *On aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2,* activate red CABIN ALT HI light if cabin altitude exceeds 14,500 feet. **When the aircraft climbs above 25,000 feet:** Resume settings specified in "Takeoff from field elevation less than 8000 ft". **NOTE:** It is possible for the aircraft to climb above 25,000 feet before an 8000-foot cabin altitude is obtained. If this happens, annunciations and emergency pressurization may occur because of the lower settings triggered at 25,000 feet.
LANDING	
Landing at field elevation less than 8000 ft (as selected on LDG ALT)	• Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 8600 feet. • Activate emergency pressurization if cabin altitude exceeds 9500 feet. • Activate cabin altitude warning horn if cabin altitude exceeds 10,100 feet. • *On aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2,* activate red CABIN ALT HI light if cabin altitude exceeds 10,100 feet.
Landing at field elevation greater than 8000 ft (as selected on LDG ALT)	Maintain the settings specified in "Landing at field elevation less than 8000 ft (as selected on LDG ALT)" until the aircraft descends below 25,000 ft. **When the aircraft descends below 25,000 feet:** • Annunciate (PRESS SYS & FAULT) loss of cabin pressure if cabin altitude exceeds 14,500 feet. • Activate emergency pressurization if cabin altitude exceeds 14,500 feet. • Activate cabin altitude warning horn if cabin altitude exceeds 14,500 feet. • *On aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2,* activate red CABIN ALT HI light if cabin altitude exceeds 14,500 feet.

NOTE

Applicable operating rules, pertaining to the use of oxygen at high cabin altitude, must be observed.

Environmental Systems (Cont)

Pressurization System (Cont)

Automatic Mode Operation

1. MODE Select Switch — Select automatic mode. MANUAL will extinguish when automatic mode is selected.
2. LDG ALT Selector — Prior to takeoff, set to landing field elevation of intended destination.
3. *If a takeoff is made from a field elevation above 8000 feet,* ensure the cabin altitude is 8000 feet or less as the aircraft climbs through 25,000 feet.

NOTE

- If the cabin altitude exceeds 8000 feet as the aircraft climbs through 25,000 feet, PRESS SYS annunciation, emergency pressurization, and cabin altitude warning horn may activate. *On aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2,* the red CABIN ALT HI light may also activate.
- When a takeoff is made from a field elevation above 8000 feet, the cabin altitude will descend to and/or remain at 8000 feet until the pressurization descent mode is entered.

Operation with a QFE Altimeter Setting

1. *If a QFE altimeter setting is being used for landing,* LDG ALT Selector — Set to zero feet.

Manual Mode Operation

NOTE

Manual mode must not be used for takeoff and landing at field elevations above 8000 feet.

1. MODE Select Switch — Depress. MANUAL will illuminate.
2. MAN ALT Control — UP, center, or DN as required to maintain satisfactory pressurization.
3. MAN RATE Control — Rotate to the desired setting.

Environmental Systems (Cont)

Pressurization System (Cont)

Return To Automatic Mode Operation

NOTE

If cabin altitude exceeds 8600 (±200) feet, the Automatic Pressurization mode is deactivated and the amber PRESS SYS and pressurization FAULT lights will illuminate. Automatic mode operation will not be available until the cabin altitude is decreased and the pressurization system is cycled to unlatch the fault.

1. MAN ALT Control — Center or DN as required to maintain cabin altitude below 8000 feet.
2. MODE Select Switch — Depress to select automatic mode. If the FAULT light remains extinguished, the system has successfully returned to the automatic mode.

If the pressurization FAULT light remains illuminated:

3. CABIN PRESS SYS Circuit Breaker (R ENVIRONMENT group) — Pull and reset. If the FAULT light extinguishes, the system has successfully returned to the automatic mode.

If the pressurization FAULT light remains illuminated:

4. The fault has not cleared and automatic mode operation is not available. Refer to **Manual Mode Operation**, page 2-90.

CABIN AIR Light *(Aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2)*

A white CABIN AIR advisory light indicates that any of the following switches are in the off position: L BLEED AIR, R BLEED AIR or CAB AIR.

Fuel Management

Fuel Quantity Indicator

A fuel quantity indicator is provided to indicate the amount of fuel in individual tanks (L WING, R WING & FUSELAGE) and the total amount of fuel onboard (TOTAL). Each individual tank and the TOTAL indication reads zero when its unusable fuel quantity is reached. The accuracy of all fuel quantity readings will be enhanced when taken with the aircraft in wings level, unaccelerated cruise flight.

If a wing fuel imbalance of 500 pounds/227 kg (200 pounds/91 kg if flaps are 8° or lower) or more occurs, the fuel quantity reading representing the heavy wing will flash and IMB will be annunciated on the fuel quantity indicator. The flashing may be cancelled by depressing the mute switch in the right thrust lever; however, IMB will remain annunciated until the fuel balance is within limits.

If a fault is detected in the fuel quantity indicating system, an error code(s) is displayed on the fuel quantity indicator. Depending on the error, the accuracy of the remaining fuel quantity indications may be degraded.

On aircraft 60-001 thru 60-158 not modified by SB 60-28-10:
The following procedures must be utilized for fuel quantity related performance computations:

- For preflight planning, loading, range, and endurance use the indicated TOTAL fuel quantity as observed on the ground.
- For all takeoff, climb, and landing performance, use the indicated TOTAL fuel quantity as observed on the ground or inflight for all weight critical performance.
- For inflight range and endurance, reduce the indicated TOTAL fuel quantity observed in wings level unaccelerated cruise flight (3°-5° nose up) by 450 pounds (204 kg).

NOTE

- If the left wing tank is allowed to go dry, the fuel quantity temperature compensator probe will be uncovered and may cause erroneous fuel quantity indications. Maintain a minimum of 50 pounds (23 kg) of fuel in the left wing tank until fuel is required.
- Fuselage tank transfer pumps are located to transfer the maximum quantity of fuel in level flight.

Fuel Management (Cont)

Fuel Quantity Indicator (Cont)

On aircraft 60-159 & subsequent and prior aircraft modified by SB 60-28-10:

The fuel quantity indicator uses aircraft attitude information to compensate for changes in the aircraft pitch attitude. Indicated fuel quantity for the fuselage tank is accurate throughout the flight envelope. Indicated fuel quantities for the wing tanks are accurate for steady state, unaccelerated cruise flight conditions between -2° and +6° pitch.

NOTE

- When aircraft attitude is greater than +6°, wing fuel in excess of approximately 1150 pounds (522 kg) will not register. Each wing tank could have up to 299 pounds (136 kg) more fuel than the indicator shows.
- If the left wing tank is allowed to go dry, the fuel quantity temperature compensator probe will be uncovered and may cause erroneous fuel quantity indications. Maintain a minimum of 50 pounds (23 kg) of fuel in the left wing tank until fuel is required.
- Fuselage tank transfer pumps are located to transfer the maximum quantity of fuel in level flight.

Fuel System Annunciators

The amber LOW FUEL light on the glareshield annunciator panel will illuminate when the fuel level in either wing tank is approximately 410 pounds (186 kg).

The FUEL SYS light on the glareshield annunciator panel will be illuminated whenever the crossflow valve is open, a standby pump is on, or any transfer/fill operation is in progress. The FUEL SYS light will flash when the fuselage tank is full and FILL is selected or empty and fuel transfer is selected. The crossflow valve will be open during wing to wing transfer, wing to fuselage transfer, or fuselage to wing transfer.

Usable Fuel

USABLE FUEL			
L Wing	**Fuselage**	**R Wing**	**Total**
1449 lb 657 kg	**5012 lb** 2273 kg	**1449 lb** 657 kg	**7910 lb** 3587 kg

Fuel Management (Cont)

Fuel Control Panel

The fuel control panel on the pedestal contains all the necessary switches to fuel the aircraft and maintain proper fuel management. The switches are alternate action type with lighted legends and status annunciators for the devices (valves and pumps) being controlled. The fuel quantity indicator is installed on the instrument panel.



This switch controls the position (open or closed) of the respective motive flow valve. When the motive flow valve is closed, the on-side jet pumps will be deactivated and the OFF annunciation will illuminate. Jet pump OFF selection will cause the Master CAUT lights to flash. If the motive flow valve is neither open nor closed, the OFF annunciation will flash.



This switch controls the operation of the respective standby electric pumps. Illumination of the ON annunciation indicates power is applied to the corresponding standby pump.



This switch controls the position (open or closed) of the crossflow valve. Illumination of the horizontal bar indicates the crossflow valve is in the open position. If the crossflow valve is neither open nor closed, the horizontal bar will flash.



This switch selects the normal fuselage fuel transfer function. Illumination of the vertical bar indicates the left fuselage transfer valve is in the open position. If the transfer valve is neither open nor closed, the vertical bar will flash. Illumination of the ON annunciation indicates power is applied to the left fuselage transfer pump.



This switch selects the auxiliary fuselage fuel transfer function. Illumination of the vertical bar indicates the right fuselage transfer valve is in the open position. If the transfer valve is neither open nor closed, the vertical bar will flash. Illumination of the ON annunciation indicates power is applied to the right fuselage transfer pump.

Fuel Management (Cont)

Fuel Control Panel (Cont)



This switch selects the gravity fuselage fuel transfer function. Illumination of the ON annunciation indicates gravity transfer is selected.



This switch selects the fuselage tank fill function. Illumination of the ON annunciation indicates fuselage fill is selected.



This annunciator shows the status of the fuel pressure in the respective engine fuel supply line. Illumination of this annunciator indicates loss of fuel pressure to the associated engine. The applicable L or R FUEL PRESS light, on the glareshield annunciator panel, will also illuminate.



This annunciator shows the status of the fuel level in the fuselage fuel tank. Illumination of the FULL annunciation indicates the fuselage fuel tank is full and FILL is selected. Illumination of the EMPTY annunciation indicates the fuselage fuel tank is empty and NORM XFR and/or AUX XFR is selected.

Fuselage Tank to Wing Fuel Transfer

Fuel may be transferred from the fuselage tank to the wings by any of the methods described below. However, fuel transfer pump operation may be minimized by selecting gravity transfer after cruise attitude has been established. If gravity transfer is selected, normal transfer should be selected when the wing fuel quantity starts to decrease.

Normal Transfer Procedure

1. NORM XFR Switch — Depress to select when wing tank fuel quantity indicates 1200 pounds (544 kg) or less in each tank. When NORM XFR is selected, the standby pumps will be de-energized, the crossflow valve will open, the left fuselage fuel transfer valve will open, and the left transfer pump will be energized. If either left or right wing tank becomes full, the left fuselage transfer valve will close and the left transfer pump will shut off until the fuel level in the wing tank drops enough to reactivate the transfer system.
2. NORM XFR Switch — Depress to deselect when desired transfer is complete or FUSELAGE EMPTY light illuminates.

Fuel Management (Cont)

Auxiliary Transfer Procedure

1. AUX XFR Switch — Depress to select when wing tank fuel quantity indicates 1200 pounds (544 kg) or less in each tank. When AUX XFR is selected, the standby pumps will be de-energized, the crossflow valve will open, the right fuselage transfer valve will open, and the right fuselage transfer pump will be energized. The system will continuously transfer fuel from the fuselage tank to the wing tanks until AUX XFR is deselected.
2. AUX XFR Switch — Depress to deselect when desired transfer is complete or Fuselage EMPTY light illuminates.

Rapid Transfer Procedure

If rapid transfer of fuselage fuel is desired:

1. NORM XFR and AUX XFR Switches — Depress to select. When NORM XFR and AUX XFR are selected, the standby pumps will be de-energized, the crossflow valve will open, both fuselage transfer valves will open, and both fuselage transfer pumps will be energized.
2. NORM XFR and AUX XFR Switches — Depress to deselect when desired transfer is complete or Fuselage EMPTY light illuminates.

Gravity Transfer Procedure

1. GRVTY XFR Switch — Depress to select. When GRVTY XFR is selected, the standby pumps will be de-energized, the crossflow valve will open, and both transfer valves will open. Fuel will gravity flow from the fuselage tank until the wing tanks are full or the fuselage and wing tank heads are equal. When using GRVTY XFR, approximately 350 pounds (159 kg) of fuselage fuel will be unusable.
2. GRVTY XFR Switch — Depress to deselect when gravity transfer is complete or prior to approach.

NOTE

- Gravity transfer may be used after cruise is established to minimize transfer pump operation. When the wing fuel quantity starts to decrease use **Normal Transfer Procedure** to transfer remaining fuselage fuel.
- When flying in extreme nose-up attitude for extended periods, fuel may gravity flow from the wing tanks to the fuselage tank. Periodically transfer fuel back into wings.

Fuel Management (Cont)

Wing to Fuselage Tank Fuel Transfer

To transfer fuel from the wing tanks to the fuselage tank, the following procedure may be used:

1. FILL Switch — Depress and hold for approximately 3 seconds to select. When FILL is selected, both standby pumps will be energized, both transfer valves will open, and the crossflow valve will open. Fuel will be transferred from the wing tanks to the fuselage tank until:
   a. Fuselage FULL light comes on, causing the standby pumps to de-energize and both transfer valves to close. When the FILL function is deselected, the FULL light will go out and the crossflow valve will close.
   b. LOW FUEL light comes on (only if left wing switch trips the light), causing the FILL function to be deselected. Transfer can be restarted with the LOW FUEL light on, if required.
   c. The aircraft lifts off causing the FILL function to be deselected. Transfer can be restarted after liftoff, if required.
2. FILL Switch — Depress to deselect when desired fuselage fuel quantity is reached. Check that fuel transfer and crossflow valves close.

Fuel Crossflow (Wing-to-Wing Transfer)

To transfer fuel from one wing tank to the other wing tank, the following procedure may be used:

CAUTION Do not crossflow with main jet pump(s) inoperative. Engine starvation may occur due to fuel being pumped through the open crossflow valve into opposite wing.

1. XFLO VALVE Switch — Depress to select open.
2. STBY PUMP Switch (heavy wing) — Depress to select ON.
3. Standby Pump (light wing) — Check Off.
4. XFLO VALVE Switch — Depress to select closed after fuel balance is obtained.
5. STBY PUMP Switches — Select Off.

Fuel Management (Cont)

Operation with Cold Wing Fuel

Operation on wing fuel exposed to indicated Ram Air Temperatures (RAT) below the freeze points shown below for 30 minutes or more may result in a reduction of usable fuel because of fuel freezing.

FUEL TYPE	FREEZE POINT (RAT)
JET A	-40°C
JP-5	-46°C
JET A-1	-50°C
JP-8	-50°C

To minimize fuel freezing at RATs below these values, transfer the warmer fuel from the fuselage tank to maintain approximately 800 pounds (363 kg) of fuel in each wing tank.

Refueling

The airplane may be fueled through a filler located in the top of each wing tank or through the single-point pressure filler below the right engine. Usable fuel using the various refuel procedures is given with the applicable procedure. Refer to Addendum I — FUEL SERVICING for refuel procedures.

Refer to Addendum I — FUEL SERVICING, for recommended anti-ice additive blending procedure.

Landing Gear and Brakes

Landing Gear Warning and Indications

The landing gear warning horn will sound and the three red UNSAFE lights will illuminate under the following conditions:

- Landing gear is not extended.
- Altitude is below 16,300 feet.
- Airspeed is below 170 KIAS.
- At least one thrust lever is below approximately 60% N1.



When the horn sounds under these conditions, the horn can be silenced by depressing the Landing Gear MUTE switch or depressing the MUTE button in the right thrust lever handle (The amber MUTE Light will illuminate). The UNSAFE light indication will continue until either the gear is lowered or one of the above conditions is corrected.

The landing gear warning horn only will sound under the following conditions:

- Landing gear is not extended.
- Flaps are lowered beyond 25°.



When the horn sounds because the flaps are lowered, the horn cannot be silenced by the MUTE switches.

Landing Gear and Brakes (Cont)

Brake System

The primary brake system utilizes hydraulic system pressure for power boost and incorporates an anti-skid system to prevent tire skid and/or tire blow-out during landing or aborted takeoff. The brakes are operated by depressing the upper portion of the rudder pedals.

NOTE

Large temperature differences between wheels after landing may indicate improper brake operation.

The parking brake is operated by depressing and holding the toe brakes (hydraulic system pressurized) and then pulling the PARKING BRAKE handle to set the brakes. Whenever the PARKING BRAKE handle is not fully in, the PARK BRAKE light will be illuminated.

An emergency air braking system is installed to provide emergency braking in the event of a hydraulic system failure. Refer to Section III for emergency braking procedures.

Normal Braking

Anti-Skid On Operation:

1. ANTI-SKID Switch — On. Check ANTI-SKID lights extinguished.
2. Apply brakes as required. Maximum braking pressures can be maintained when anti-skid is operative.

NOTE

The takeoff and landing distances with anti-skid On, presented in Section V of this manual, are based on full anti-skid braking from first brake application to complete stop.

Anti-Skid Off Operation:

When anti-skid is inoperative, care must be used during brake application and stopping distances will be increased. Refer to Section IV for operation of the brake system with anti-skid off, and Section V for increased stopping distances.

Emergency Braking

In the event of a normal brake system failure, emergency (pneumatic) brakes can be used to stop the airplane. Refer to Section III for operation of the emergency brake system.

Spoiler System

Normal Spoilers

During the normal spoiler mode, the spoilers are symmetrically extended and retracted through the SPOILER EXT-ARM-RET lever on the forward pedestal. Normal spoiler operation overrides the aileron augmentation mode of operation and the SPOILER EXT annunciator light will be illuminated anytime spoilers are extended 1° or more during normal spoiler operation. With flaps extended 3° or more and spoilers extended, the SPOILER EXT light will flash. The spoilers may be extended to any desired position. Detents for approximately 10° and 20° positions are provided between the ARM and EXT positions of the lever. On the ground, the spoilers will extend fully whenever any partial extension is selected. The maximum attainable extension will be reduced as airspeed increases. The position of the spoilers is shown on the SPOILER indicator. Without AC electrical power available, the EXT mode will not provide spoiler extension until both squat switches are in the ground mode.

Autospoilers

On aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6:

The autospoiler system is pilot controlled through the SPOILER EXT-ARM-RET lever on the forward pedestal. When ARM is selected, the SPOILER ARM light will illuminate. When the system is armed, both squat switches are in the ground mode, and both thrust levers are at IDLE or CUTOFF, the spoilers will automatically deploy and the SPOILER EXT light will illuminate. When the spoilers have been automatically deployed, advancing either thrust lever above IDLE will cause the spoilers to retract. Failure of the SPOILER ARM light to illuminate indicates a malfunction.

The autospoiler system is used to automatically extend the spoilers in the event of an aborted takeoff. The autospoilers may also be used for landing. However, because of delayed autospoiler deployment during soft landings, EXT should be selected even if the autospoilers are armed.

Autospoilers are not operational when manual EXT or RET is selected.



During single engine operation, the autospoilers will operate normally with the inoperative engine's thrust lever in either IDLE or CUTOFF.

Spoiler System (Cont)

Autospoilers (Cont)

On aircraft 60-079, 60-094 and subsequent, and prior aircraft incorporating SB 60-27-6:

The autospoiler system is pilot controlled through the SPOILER EXT-ARM-RET lever on the forward pedestal. When ARM is selected with both squat switches in the ground mode and both thrust levers at IDLE (see note for single engine operation), the autospoilers will automatically deploy, and the SPOILER ARM and SPOILER EXT lights will illuminate. The autospoilers will not deploy if either thrust lever is above IDLE when ARM is selected. Failure of the SPOILER ARM light to illuminate indicates a malfunction.

When the spoilers have been automatically deployed, advancing either thrust lever above IDLE will cause the autospoilers to retract. The autospoilers will automatically deploy at ground speeds above 40 knots with both thrust levers in IDLE (see note for single engine operation), as in the case of an aborted takeoff.

The autospoiler system is also used to automatically extend the autospoilers on landing. Upon landing with ARM selected and both thrust levers in IDLE, the autospoilers will deploy when the wheels spin up through 40 knots or when both squat switches transition to ground mode. Advancing either thrust lever above IDLE will cause the autospoilers to retract.



Taxiing with autospoilers armed at a ground speed greater than 40 knots and thrust levers in IDLE may cause the autospoilers to deploy.

Without AC electrical power available, both squat switches must be in ground mode for autospoilers to extend (regardless of wheel speed). Therefore, autospoiler extension may be delayed slightly during soft landings without AC electrical power.

Autospoilers are not operational when manual EXT or RET is selected.



During single engine operation, the autospoilers will operate normally with the inoperative engine's thrust lever in either IDLE or CUTOFF.

Spoiler System (Cont)

Spoilerons (Aileron Augmentation)

During the spoileron (aileron augmentation) mode, the spoilers are independently raised and lowered with the upgoing aileron to improve lateral control with the flaps down. Aileron augmentation is automatically engaged when the flaps are lowered beyond 25° and the SPOILER lever is in the ARM or RET position.

During the spoileron test, if SPOILER MON light does not come on, possible failures are:

- Computer monitor failure.
- Spoileron selector valve failure.

Continued operation with either of these failure modes could result in inadvertent asymmetrical spoiler extension. Malfunction should be corrected before flight.

Spoiler Monitor

If the spoiler or spoileron system malfunctions, the SPOILER MON light will come on and the spoilers will retract. Refer to the **SPOILER MON Light Illuminated In Flight** procedure, in Section IV.

Stall Warning System

The aircraft is equipped with a stall warning system to provide the crew with visual and tactile warning of an impending stall. The stall warning system consists of an angle-of-attack indicator for each crew position, L and R STALL warning lights, a stick shaker for each crew position, and Low Speed Cues (LSC) on both PFDs (airspeed displays).

The system will automatically decrease stall warning speeds as the flaps go from 0º to 40º. Above approximately 18,100 feet pressure altitude, the system increases stall warning speeds by approximately 15 knots. These shifts in stall speeds are reflected in the LSC on each PFD.

Angle-of-Attack Indicators

The angle-of-attack (AOA) indicators, located on the pilot's and copilot's instrument panels, provide a visual indication of angle-of-attack. The scale ranges from 1.0 (max lift) to 0 (zero lift). Each indicator face is divided into three segments as follows: green-safe, amber-caution/shaker (activated at .82 AOA), and red-warning.



Angle-of-Attack (AOA) Indicator
Figure 2-4

Low Speed Cues

In addition to angle-of-attack indicators, low speed cues are displayed on the left side of the PFDs. They indicate impending stall speed (speed at which the stick shaker triggers), and a 1.3Vs approach cue.

WARNING

Low speed cues serve as an approximation of stall speed and do not replace the actual stall warning system.

Thrust Reverser System

The thrust reverser system is designed for use on the ground to reduce the aircraft stopping distance. Hydraulically actuated target-type doors are used to redirect the exhaust gases to produce the reverse thrust.

WARNING

Anytime the hydraulic system is pressurized by an engine-driven pump(s) or an external hydraulic source, the thrust reversers have the potential to deploy. Pressure from the auxiliary hydraulic pump is not available to the thrust reverser system.

The system is electrically controlled with the status of each thrust reverser annunciated by a green TR ARM, an amber TR UNLOCK, and a white TR DEPLOY light.

NOTE

Except as described in **Normal Deploy** and **Normal Stow** below, all amber or white annunciations indicate abnormal or emergency conditions.

There is no thrust reverser control panel. The thrust reverser levers located on top of the thrust levers and the system's circuit breakers are the only devices used by the crew to operate the system.

Normal Deploy

In order to deploy a thrust reverser, the following prerequisite conditions must be satisfied:

- TR CONT and TR AUTO STOW circuit breakers — Set.

NOTE

The TR AUTO STOW circuit breaker should be set, but is not required for the thrust reverser to deploy.

- Aircraft on the ground (squat switches in ground mode).
- Applicable Thrust Lever — IDLE.
- Hydraulic pressure available from an engine-driven hydraulic pump.

When the above conditions are satisfied, the green TR ARM light will illuminate indicating hydraulic pressure is available to the thrust reverser. Lifting the thrust reverser lever to the DEPLOY detent will initiate deployment of the thrust reverser doors. While the doors transition from stow to deploy, the amber TR UNLOCK light will illuminate and a signal to the engine FADEC will limit thrust to idle power. When the doors reach the fully deployed position, the white TR DEPLOY light will illuminate, the amber TR UNLOCK light will extinguish and a signal to the engine FADEC will allow engine thrust to increase above idle. The N_1 bug will reposition indicating the FADEC is utilizing the reverse thrust schedule. The system incorporates a throttle

Thrust Reverser System (Cont)

Normal Deploy (Cont)

balk solenoid which inhibits either thrust reverser lever from moving significantly above reverse idle until both thrust reversers are fully deployed. Moving the thrust reverser lever above reverse idle allows the engine to spool up providing the desired amount of reverse thrust. The FADEC will schedule reverse thrust as a function of airspeed (provided by ADC 1 and 2), decreasing thrust as the airplane slows down. If airspeed data is not provided to the FADEC, the maximum reverse thrust available will be 65% N1.

NOTE

Excessive force applied to the thrust reverser levers may prevent the balk solenoid from releasing.

Normal Stow

Each thrust reverser door is mechanically secured in the stowed position by a four-bar over-center door linkage. This mechanism is referred to as the primary latch. Additionally, *on aircraft 60-041 & subsequent and previous aircraft modified by SB 60-78-2,* each thrust reverser door is secured in the stowed position by a hydraulically-actuated secondary latch.

After a normal deployment and use of reverse thrust, normal stow is accomplished by returning the thrust reverser levers to the STOW position. While the doors transition from deploy to stow, the white TR DEPLOY light will extinguish and the amber TR UNLOCK light will illuminate. Once the doors are in the fully stowed position (primary latch engaged), normal forward thrust will be available. When the doors reach the fully stowed and locked position (both primary and secondary [if applicable] latches engaged), the amber TR UNLOCK light will extinguish.

Auto Stow

Each thrust reverser door is mechanically secured in the stowed position by a four-bar over-center door linkage (primary latch). If the system senses an unlocked primary latch in flight, the automatic stowing sequence is initiated which reduces engine thrust to idle and hydraulically stows and secures the thrust reverser doors.

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Introduction

The procedures in this section of the manual have been developed by Learjet Inc. for certification of this aircraft. This section contains those operating procedures requiring the use of special systems and/or regular systems in order to protect the occupants and the aircraft from harm during a critical situation requiring immediate response. Procedures or parts of procedures in this section emphasized by enclosure in a box such as this  and boldfaced should be accomplished without reference to this manual (memorized). Data that is enclosed in a box but **not** boldfaced need not be memorized.

The procedures located in this section supplement Normal Procedures when an emergency condition exists. Use of Normal Procedures should be continued when applicable. Sound judgement as well as thorough knowledge of the aircraft, its characteristics, and the flight manual procedures are essential in the handling of any emergency situation.

OVERRIDING CONSIDERATIONS

In all emergencies, the overriding consideration must be to:

- Maintain Airplane Control
- Analyze the Situation
- Take Proper Action

Terminology

Many emergencies require some urgency in landing the aircraft. The degree of urgency required varies with the emergency; therefore, the terms “land as soon as possible” and “land as soon as practical” are employed. These terms are defined as follows:

Land as soon as possible — A landing should be accomplished at the nearest suitable airfield considering the severity of the emergency, weather conditions, field facilities, ambient lighting, and aircraft gross weight.

Land as soon as practical — Emergency conditions are less urgent, and although the mission is to be terminated, the degree of the emergency is such that an immediate landing at the nearest adequate airfield may not be necessary.

Battery Overheat *(Aircraft with nickel-cadmium batteries)*

NOTE

If either BAT 140 or BAT 160 light illuminates during flight, both batteries must be checked per Chapter 12 of the Maintenance Manual after landing.

BAT 140 Light Illuminated

1. BAT TEMP Indicator — Monitor to determine affected battery.
2. Affected BATTERY Switch — OFF.
3. Land as soon as practical.

BAT 160 Light Illuminated

1. BAT TEMP Indicator — Monitor to determine affected battery.
2. Affected BATTERY Switch — OFF.
3. Land as soon as possible.

Dual Generator Failure

1. START-GEN Switches — Check, GEN.
2. L and R START (ENGINE Group) and GEN (ELECTRICAL Group) Circuit Breakers — Set.
3. Electrical Load — Reduce.
   a. COOL Switch — OFF.
   b. AUX HT Switch — OFF.
   c. WSHLD DEFOG Switch — OFF.
4. GEN RESET Switches — RESET momentarily.

CAUTION

Depressing and holding the GEN RESET switch(es) longer than one second, or multiple activations, may cause damage to the electrical system.

If generators do not reset:

5. N_2 — 80% RPM or above.
6. START-GEN Switches — OFF, then GEN.
7. GEN RESET Switches — RESET momentarily.

CAUTION

Depressing and holding the GEN RESET switch(es) longer than one second, or multiple activations, may cause damage to the electrical system.

If generators do not reset:

8. START-GEN Switches — OFF.
9. JET PUMP Switches — Check, On.

Dual Generator Failure (Cont)

10. *If there is fuel in the fuselage tank,* GRVTY XFR Switch — Select ON.

NOTE

With GRVTY XFR selected, approximately 350 pounds (159 kg) of fuselage fuel will be unusable.

11. Floodlights — On for night operations.
12. EMER BAT Switches — Check, on.
13. EMER BUS Switch — EMER BUS.

NOTE

- Electrical power will be supplied by the main batteries (EMER BUS) and the emergency power supplies. Fully charged main batteries (standard lead-acid) and the emergency power supplies should power the minimum electrical equipment for night instrument flight for at least 1 hour from the time both generators are off. Actual operating times will differ for individual aircraft. Refer to Addendum, Equipment & Operating Time for aircraft-specific battery operating time.
- EMER BUS switch may be returned to the NORMAL position if it is desired to restore electrical power to all systems. The main batteries will discharge at a faster rate under this condition.

14. ● **On aircraft 60-001 thru 60-248,** Airspeed — 0.75 MI or below.
14. ● **On aircraft 60-249 & subsequent,** Airspeed — 0.77 MI or below.
15. Altitude — 38,000 feet or below.

NOTE

When using the standby indications, refer to **AIRSPEED** and **MACH CALIBRATION — STANDBY SYSTEM** and **ALTITUDE POSITION CORRECTION — STANDBY SYSTEM,** in Section V.

Dual Generator Failure (Cont)

16. The following table lists the conditions that will exist in EMER BUS Mode:

SYSTEM	CONDITION
Anti-Ice	
Nacelle Heat	Nacelle heat (bleed air) will be on regardless of NAC HEAT Switch position.
Pitot Heat	L & R Inoperative; Standby Operative.
Wing Temp Indicator	Inoperative.
All Other Systems	Inoperative. Avoid icing conditions.
Autopilot/Yaw Damper	Inoperative.
Avionics/Displays	
ADC	ADC 1 Operative; ADC 2 Inoperative.
ADF	ADF 1 Operative; ADF 2 (if installed) Inoperative.
AHS	AHS 1 & AHS 2 Operative.
ATC	ATC 1 Operative; ATC 2 (if installed) Inoperative.
Audio Panels	Operative.
COM (VHF)	COM 1 Operative; COM 2 Inoperative.
CVR	Operative.
EFIS Displays	Both PFDs & MFDs Inoperative.
Electric Power Monitor	Operative.
FDR	Operative (if installed).
FMS(es)	Inoperative.
NAV	NAV 1 Operative; NAV 2 Inoperative. (VOR Nav & ADF capability thru the SDU)
RTU	RTU 1 Operative; RTU 2 Inoperative.
Sensor Display Unit	Operative (HDG from AHS 1).
All Other Avionics	Inoperative.
Climate Controls	
Cabin Temp	Inoperative (will go to full cold).
Cockpit Temp	Inoperative (will go to full cold).
Engine	
Fire Detection	Operative.
Fire Extinguishing	Operative.
Ignition	Operative.
N_1 Indicators	Operative.
ITT Indicators	Operative.
N_2 Indicators	Inoperative.
Fuel Flow Indicators	Inoperative.
Oil Press Indicators	Inoperative.
Oil Temp Indicators	Inoperative.
SYNC	Inoperative.
Firewall Shutoff Valves	Operative.
Flap System	Operative.
Flap Position Indicator	Operative.

Continued

Dual Generator Failure (Cont)

SYSTEM	CONDITION
Fuel System	
Crossflow Valve	Operative.
Fill	Inoperative.
Fuel Quantity Indicator	Operative. *On aircraft 60-159 & subsequent and prior aircraft modified by SB 60-28-10,* the TOTAL fuel quantity window will display an error code. The fuel quantity for individual tanks remains valid.
Fus Tank Pumps	Operative. Use only if necessary to transfer fuel rapidly.
Gravity Transfer	Operative.
Jet Pumps	Operative.
Standby Pumps	Inoperative.
Hydraulic System	
HYD PRESS Indicator	Inoperative.
Aux Hydraulic Pump	Operative.
Landing Gear System	Operative.
Anti-Skid	Inoperative.
BRAKE AIR Indicator	Inoperative.
GEAR AIR Indicator	Inoperative.
Gear Indication	DOWN and UNSAFE lights operative.
Lighting — Cockpit	
Floodlights	Operative.
CENTER PNL/ PEDESTAL	Lighting for standby altimeter, standby attitude, standby airspeed, N_1, ITT, spoiler, flap, trim, cabin pressure, angle-of-attack, and fuel quantity indicators, electric power monitor, fuel control panel and magnetic compass is operative. For night operations, a flashlight may be necessary.
All Other Lighting	Inoperative.
Lighting — Exterior	Inoperative.
Pressurization System	
Auto Mode	Operative.
Cabin Press Indicator	Operative.
EMER Mode	Inoperative.
Manual Mode	Operative.
Oxygen System	Operative.
Oxygen Indicator	Inoperative.
Spoiler System	
Spoilers/Spoilerons	Inoperative in flight. Spoilers operative on ground.
Spoiler Position Indicator	Operative.
Stall Warning System	Operative.
AOA Indicators	Operative.
Standby Instruments	
Airspeed	Operative.
Altimeter	Operative.
Attitude	Operative.
Magnetic Compass	Operative.
Standby Lighting	Operative.

Continued

Dual Generator Failure (Cont)

SYSTEM	CONDITION
Thrust Reversers	Inoperative.
Trim System	
Aileron & Rudder Trim	Inoperative. Will remain at last setting.
Mach Trim	Inoperative. **Do not exceed MMO.**
Pri & Sec Pitch Trim	Operative.
Trim Indicators (x3)	Operative.
Warning System	
Lights	Operative.
Horns	Operative.
Trim-In-Motion	Operative.

17. ● **If the time to the landing airport will NOT exceed main battery operating time:**
    a. Land as soon as practical.
    Before Landing:
    b. EMER BUS Switch — NORMAL.
    c. GRVTY XFR Switch — Select Off.
    d. This checklist is complete.

17. ● **If the time to the landing airport exceeds main battery operating time:**
    a. Land as soon as possible.
    b. Battery Voltage — Monitor.
    When the aircraft battery voltage reaches 18 Volts:
    c. BATTERY Switches — OFF.

NOTE

If the aircraft's main batteries are depleted or selected OFF, the only electrical power available will be from the emergency power supplies.

    d. Refer to **Normal Electrical System Failure Landing** procedure, Section IV.
    e. The following table lists the conditions that will exist (main batteries depleted or selected OFF):

SYSTEM	CONDITION
Anti-Ice	
Nacelle Heat	Nacelle heat (bleed air) will be on regardless of NAC HEAT Switch position.
Wing Temp Indicator	Inoperative.
All Other Systems	Inoperative. Avoid icing conditions.
Autopilot/Yaw Damper	Inoperative.

Continued

Dual Generator Failure (Cont)

SYSTEM	CONDITION
Avionics/Displays	
EFIS Displays	Inoperative. Use standby instruments.
Sensor Display Unit	Inoperative.
ILS 1	*On aircraft 60-249 & subsequent,* Operative (displayed on ISIS).
RTU 1	*On aircraft 60-249 & subsequent,* Operative (for tuning ILS 1).
All Other Avionics	Inoperative.
Climate Controls	
Cabin Temp	Inoperative (will go to full cold).
Cockpit Temp	Inoperative (will go to full cold).
Engine	
Fire Detection	Inoperative.
Fire Extinguishing	Inoperative.
Ignition	Inoperative.
N_1 Indicators	Operative.
ITT Indicators	Inoperative.
N_2 Indicators	Inoperative.
Fuel Flow Indicators	Inoperative.
Oil Press Indicators	Inoperative.
Oil Temp Indicators	Inoperative.
SYNC	Inoperative.
Firewall Shutoff Valves	Inoperative.
Flap System	Inoperative.
Flap Position Indicator	Inoperative.
Fuel System	
Electric Pumps	Inoperative.
Fuel Quantity Indicator	Inoperative.
System Valves	Will remain in their last position.
Hydraulic System	
HYD PRESS Indicator	Inoperative.
Aux Hydraulic Pump	Inoperative.
Landing Gear System	Inoperative. Use Alternate Gear Extension/Electrical Malfunction procedure, Section IV.
Anti-Skid	Inoperative.
BRAKE AIR Indicator	Inoperative.
GEAR AIR Indicator	Inoperative.
Gear Indication	DOWN and UNSAFE lights operative.
Lighting — Cockpit	
Floodlights	Inoperative.
Instruments	Lighting for magnetic compass, standby altimeter, standby attitude, standby airspeed, and N_1 indicators will be operative. For night operations, a flashlight may be necessary.
All Other Lighting	Inoperative.

Continued

Dual Generator Failure (Cont)

SYSTEM	CONDITION
Lighting — Exterior	Inoperative.
Auto Mode	Inoperative.
Cabin Press Indicator	Inoperative.
EMER Mode	Inoperative.
Manual Mode	Operative.
Oxygen System	Operative.
Pressurization System	
Auto Mode	Inoperative.
Cabin Press Indicator	Inoperative.
EMER Mode	Inoperative.
Manual Mode	Operative.
Oxygen System	Operative.
Oxygen Indicator	Inoperative.
Spoiler System	
Spoilers/Spoilerons	Inoperative.
Spoiler Position Indicator	Inoperative.
Stall Warning System	Inoperative. Maintain adequate margin above stall speed by reference to standby airspeed indicator.
AOA Indicators	Inoperative.
Standby Instruments	
Airspeed	Operative.
Altimeter	Operative.
Attitude	Operative.
Magnetic Compass	Operative.
Standby Lighting	Operative.
Thrust Reversers	Inoperative.
Trim System	
Aileron & Rudder Trim	Inoperative. Will remain at last setting.
Mach Trim	Inoperative. **Do not exceed MMO.**
Pri & Sec Pitch Trim	Inoperative.
Trim Indicators (x3)	Inoperative.
Warning System	
Lights	Inoperative.
Horns	Inoperative.
Trim-In-Motion	Inoperative.

Engine Failure

During Takeoff

Below V1 Speed

1. **Wheel Brakes — Apply.**
2. **Thrust Levers — IDLE.**
3. **Spoilers — EXT.**

4. Thrust Reversers — Deploy, if necessary.
5. ●**If rejected takeoff was made at a weight above the turn-around brake energy weight (see applicable LANDING WEIGHT LIMIT chart in Section V),** observe the **TURN-AROUND LIMITS** in Section I.
5. ●**If rejected takeoff was made at a weight above the landing maximum brake energy weight (see applicable LANDING WEIGHT LIMIT chart in Section V)**, see maintenance personnel to perform the High Energy Stop inspection.

NOTE

If the stop was conducted above the landing maximum brake energy limit, it is recommended that the PARKING BRAKE be released and chocks used. This will increase brake cooling efficiency and reduce the possibility of wheel fuse plug release and brake/tire fire.

Above V1 Speed

1. **Rudder and Ailerons — As required, for directional control.**
2. **Accelerate to V_R. Keep nose wheel on the ground.**
3. **Rotate at V_R; Climb at V_2.**
4. **GEAR — UP, when positive rate of climb is established.**
5. **When clear of obstacles, accelerate to V_2 + 20 and retract flaps.**

6. APR Switch — OFF.
7. Refer to **Engine Shutdown In Flight** procedure, Section IV or **Engine Fire — Shutdown** procedure, this section.

Engine Failure (Cont)

In Flight

1. Control Wheel Master Switch (MSW) — Depress and release. Yaw damper and autopilot will disengage.
2. Rudder and Ailerons — As required, for directonal control.
3. Thrust Lever (operative engine) — Increase as required.
4. ENG SYNC Switch — OFF.
5. Rudder Trim — As required.
6. Yaw Damper — As desired.
7. Autopilot — As desired.
8. Refer to **Engine Shutdown In Flight** procedure, Section IV.

During Approach

1. **Control Wheel Master Switch (MSW) — Depress and release.** Yaw damper and autopilot will disengage.
2. **Thrust Lever (operative engine) — Increase as required.**
3. **Flaps — 20° maximum.**
4. **Airspeed — 1.3 VS (Flaps 20°) minimum.**

5. Rudder Trim — As required.

NOTE

During a coupled approach, full rudder trim may be required with an actual engine failure. Use rudder pedal force as necessary to maintain slip/skid indicator centered.

6. Yaw Damper — As desired.

NOTE

- Approach may not be continued to Category II minimums.
- Autopilot may be re-engaged, but must be disengaged at 200 feet AGL.

7. Autopilot — As desired.
8. Refer to either of the following procedures as applicable:
   - **Single Engine Landing**, Section IV.
   - **Go Around**, Section II and **Engine Shutdown In Flight**, Section IV.

Engine Fire — Shutdown

An engine fire is usually accompanied by other indications, such as: excessive ITT, erratic or rough engine operation, fluctuating engine indications, or smoke in the cabin.

Affected engine:

1. **Thrust Lever — IDLE, unless a critical thrust situation exists.**
2. ●**If fire continues more than 15 seconds or there are other indications of fire:**
   a. **Thrust Lever — CUTOFF**

NOTE

Engine compressor stalls and unusual engine sounds may occur during engine shutdown. This is normal and will not cause any damage to the engine.

   b. **ENG FIRE PULL Handle — Pull.**

NOTE

Pulling the ENG FIRE PULL handle stops the flow of fuel and hydraulic fluid to the engine, shuts off bleed air from the engine, and arms the engine fire extinguishing system. *On aircraft 60-001 thru 60-015,* the EMER PRESS light may illuminate to indicate that emergency pressurization is not available from the affected engine.

   c. **ENG EXT ARMED Light — Depress one.**

   d. ■**If fire continues:**
      (1) Depress remaining ENG EXT ARMED Light.
      (2) Land as soon as possible.
      (3) Go to step e.

   d. ■ **If fire extinguishes:**
      (1) Land as soon as practical.
      (2) Go to step e.

   e. IGNITION Switch — OFF.
   f. Yaw Damper — Off, retrim as desired; then Yaw Damper — As desired.
   g. ENG SYNC Switch — OFF.
   h. JET PUMP Switch — OFF; STBY PUMP Switch — Select Off.
   i. START-GEN Switch — OFF.

Engine Fire — Shutdown (Cont)

j. Electrical Load — Monitor. Reduce, if required to prevent overloading the operating generator.

NOTE

During single-generator operations in flight, the COOLing system, CREW AUX HT, and loads on the CABIN PWR BUS are automatically deactivated. Further load reduction may be required to observe generator limits.

k. XFLO VALVE Switch — Select Open. Monitor fuel balance. Crossflow as required.

NOTE

During single-engine operation, maintain slip/skid indicator centered.

l. Refer to **Single Engine Landing**, Section IV.

m. This checklist is complete.

2. ● **If fire extinguishes in less than 15 seconds:**

a. Leave thrust lever at IDLE, unless a critical thrust situation exists.

b. Yaw Damper — Off, retrim as desired; then Yaw Damper — As desired.

c. ENG SYNC Switch — OFF.

d. Monitor fuel balance. Crossflow as required.

e. Land as soon as practical.

f. Refer to **Single Engine Landing**, Section IV.

g. This checklist is complete.

Immediate Engine Airstart

WARNING

Do not attempt an airstart following an engine failure which was accompanied by indications of internal engine damage or fire.

Successful immediate relights have been accomplished at 25% N_2 and altitudes up to 35,000 feet and at 40% N_2 at 40,000 feet. An immediate airstart may be attempted before engine decelerates below 25% N_2.

Affected Engine:

1. **Thrust Lever — IDLE.**
2. **IGNITION Switch — On.**

3. ● **If ITT is approaching the limit and rising rapidly** or **there is no indication of light-off within 60 seconds:**
   a. Thrust Lever — CUTOFF.
   b. IGNITION Switch — OFF.
   c. Perform **Engine Shutdown In Flight** procedure, Section IV.
   d. This checklist is complete.

3. ● **If airstart is complete:**
   a. Thrust Lever — Advance.
   b. IGNITION Switch — OFF.
   c. This checklist is complete.

OIL PRESS Light Illuminated or Oil Temperature is High

Illumination of a red OIL PRESS warning light indicates that oil pressure for the respective engine is below 20 psi (138 kPa). In the event a low OIL PRESS light illuminates in flight, or engine oil temperature exceeds redline (135° C):

Affected Engine:

1. Check oil pressure and oil temperature.
2. ●**Oil pressure is less than 20 psi:**
   a. *If flight conditions permit*, a precautionary engine shutdown is advised. Refer to **Engine Shutdown In Flight** procedure, Section IV.
   b. This checklist is complete.
2. ●**Oil pressure is between 20 and 36 psi, or oil temperature is high:**
   a. *If flight conditions permit*, reduce power to maintain oil temperature limits.
   b. This checklist is complete.
2. ●**Oil pressure and oil temperature are normal:**
   a. Continue to monitor engine operation.
   b. This checklist is complete.

ENTRY DOOR or AFT CAB DOOR Light Illuminated

Illumination of either the red ENTRY DOOR or AFT CAB DOOR light indicates that one or more of the locking pins in the respective door may not be fully engaged. The ENTRY DOOR light will also illuminate if the key lock is in the locked position. The AFT CAB DOOR light will also illuminate if the door handles are not in the latched position or the streamered lock pin is installed. During flight, the respective door should not be approached if the red ENTRY DOOR or AFT CAB DOOR light is illuminated; however, while on the ground, door latch pin engagement may be visually verified.

The cabin entry door has 12 latch pins. Six pins on the upper portion can be viewed through ports in the door upholstery. Four pins in the lower portion may be viewed by lifting the carpet tabs to reveal the view ports. Assure that white lines on door structure align with white lines on latch pins. Two latch pins located at the upper/lower door interface, are visible through the upholstery gap at the interface and do not have white lines.

The aft cabin door has 8 latch pins. Six pins can be viewed through ports in the door upholstery. Assure that white lines on door structure align with white lines on latch pins. Two latch pins are visible through the upholstery gap at the base of the door and do not have white lines.

If all latch pins are fully engaged, the most probable cause of an illuminated DOOR light is a latch pin switch malfunction.

WARNING Door failure may be indicated by loud noise, pressurization leak, or rumble emanating from door area. **Do not approach door**.

DOOR Light Accompanied by Evidence of Door Failure

1. FASTEN SEAT BELT Switch — On.
2. EMER DEPRESS Switch — Lift guard and depress. The cabin altitude will climb to approximately 13,700 feet and stabilize.
3. Airspeed — Reduce.
4. Establish descent.
5. Land as soon as practical.

DOOR Light *Not* Accompanied by Evidence of Door Failure

1. FASTEN SEAT BELT Switch — On.
2. Continue flight. The most probable cause is a latch pin switch malfunction.

EXT DOORS Light Illuminated

Illumination of the red EXT DOORS light indicates that the tailcone baggage door and/or tailcone access door is not properly closed and latched. The primary purpose of the light is to indicate a door open condition prior to takeoff. If the doors were properly latched prior to takeoff and the light illuminates in flight, the most probable cause is a switch failure.

In the event the EXT DOORS light illuminates in flight:

1. Avoid slips or skids that could open doors.
2. Investigate and correct cause of light upon landing.

BLEED AIR Light Illuminated

If either the red BLEED AIR L or BLEED AIR R warning light illuminates, an overheat sensor in the bleed-air ducting or the pylon structure has tripped the light. If both the BLEED AIR L and BLEED AIR R warning lights illuminate simultaneously, the bleed air overheat sensor in the tailcone has tripped the lights.

One BLEED AIR Light Illuminates

1. Corresponding BLEED AIR Switch — OFF.
2. ●**If light does not go out:**
   a. Reduce power on corresponding engine.
   b. ■**If light goes out:**
      (1) Continue operation with reduced power.
      (2) This checklist is complete.
   b. ■**If light still does not go out:**
      (1) Land as soon as practical.
      (2) This checklist is complete.
2. ●**If light goes out,** this checklist is complete.

BLEED AIR Light Illuminated (Cont)

Both BLEED AIR Lights Illuminate Simultaneously

1. Reduce the bleed air flow:
   a. WING STAB HEAT and WSHLD HEAT Switches — OFF.
2. ●**If in icing conditions:**
   a. WING HEAT Circuit Breaker (R ANTI-ICE group) — Pull. The WING TEMP indicator will be inoperative.
   b. STAB WING HEAT Switch — STAB WING HEAT. This will provide stabilizer heat without activating the wing heat.
   c. WSHLD ALC Switch — WSHLD ALC. This will anti-ice the pilot's windshield only and give alcohol flow for approximately 45 minutes.
   d. Fly out of icing conditions.
   e. Go to step 3.
2. ●**If not in icing conditions,** go to step 3.
3. ■**If lights do not go out:**
   a. R BLEED AIR Switch — OFF. *If lights go out,* continue operation with switch OFF. This checklist is complete.
   b. *If lights do not go out,* R BLEED AIR Switch — ON and L BLEED AIR Switch — OFF. *If lights go out,* continue operation with switch OFF. This checklist is complete.

   If lights still do not go out:
   c. One BLEED AIR Switch — EMER.
   d. Other BLEED AIR Switch — OFF.
   e. Adjust power on engine supplying EMER air to modulate cabin temperature.
   f. Land as soon as practical. This checklist is complete.
3. ■**If lights go out,** this checklist is complete.

Cabin Altitude Warning Horn Activates, Cabin Altitude Exceeds 10,000 Feet, or CABIN ALT HI Light Illuminates (If Applicable) (Emergency Descent)

NOTE

Red CABIN ALT HI warning light installed only on aircraft 60-271 & subsequent and prior aircraft modified by SB 60-31-1 or SB 60-31-2.

1. **Crew Oxygen Masks — Don. Select 100% oxygen.**
2. **Thrust Levers — IDLE.**
3. **Autopilot — Disengage.**
4. **SPOILER Lever — EXT.**
5. **Descend at MMO/VMO, but *not* below minimum safe altitude.**
6. **PASSENGER OXYGEN Valve — DEPLOY.**

WARNING

If structural failure is evident, limit speeds and maneuvering loads as much as possible in descent.

NOTE

- To establish descent, use an initial 10°-12° nose-down pitch attitude. Descent from 51,000 feet to 15,000 feet requires approximately 4 minutes 35 seconds.
- Hats and "ear-muff" type headsets must be removed prior to donning crew oxygen masks.
- The thrust lever MUTE button will mute the cabin altitude warning horn for 60 seconds.

7. Pilot and Copilot NORM MIC/OXY MIC Switches — OXY MIC.

NOTE

With the switches in this position, both cockpit speakers, phone and interphone function will be activated, enabling the crew to communicate via the interphone.

If time and conditions permit:

8. Transponder — Emergency 7700.
9. Notify controlling agency.
10. Check condition of passengers and provide assistance if conditions permit.

NOTE

Communication with passengers can be accomplished by using PASS function of the audio control panel.

CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke, or Fumes

A cabin fire is usually accompanied by the presence of smoke or fumes in the cabin area. In addition, a smoke detector installed in the aft cabin baggage area will cause the red CABIN FIRE warning light to illuminate if there is smoke in the baggage area. The warning light will extinguish when smoke is cleared.

1. **Crew Oxygen Masks — Don. Select 100% oxygen.**
2. **Smoke Goggles — Don.**
3. **EMER DEPRESS Switch — Lift guard and depress.**
4. **Pilot and Copilot NORM MIC/OXY MIC Switches — OXY MIC.**

NOTE

- It may be necessary to select EMER on the crew oxygen mask regulator if mask does not seal properly.
- The cabin altitude will climb to aircraft altitude or approximately 13,700 feet whichever is lower and stabilize with the EMER DEPRESS switch selected on.

Whether or not smoke has dissipated, if it cannot be visibly verified that the fire has been extinguished:

5. CABIN FAN Control — Rotate to off detent.
6. COOL Switch — OFF.
7. Cockpit Door/Curtain — Open.
8. Land as soon as possible.
9. ● **If source is not known,** isolate source of smoke or fumes, and go to one of the following procedures:
   - **Bleed Air System Is Suspected Source**, page 3-20.
   - **Electrical System Is Suspected Source**, page 3-21.

9. ● **If source is known:**
   a. Protective Breathing Equipment — One crew member, don.
   b. Extinguish fire using hand-held extinguisher or eliminate the source of smoke or fumes.

NOTE

Crew exposure to high levels of Halon fire extinguisher vapors may result in dizziness, impaired coordination and reduced mental alertness.

CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke or Fumes (Cont)

c. ■**If fire is not extinguished:**
   (1) Land as soon as possible.
   (2) This checklist is complete.

c. ■**If fire is extinguished and can be visibly verified:**
   (1) Land as soon as practical. At the crew's discretion, the pressurization and oxygen systems may be returned to normal.
   (2) *If smoke or fumes continue,* One or Both BLEED AIR Switches — EMER until smoke or fumes are eliminated. Advancing thrust levers will increase airflow.
   (3) This checklist is complete.

Bleed Air System Is Suspected Source

1. R BLEED AIR Switch — OFF.
2. ●**If smoke or fumes continue:**
   a. R BLEED AIR Switch — ON.
   b. L BLEED AIR Switch — OFF.
   c. ■**If smoke or fumes continue:**
      (1) L BLEED AIR Switch — ON.
      (2) Refer to **Electrical System Is Suspected Source**, page 3-21.
   c. ■If **smoke or fumes are eliminated:**
      (1) Land as soon as practical.
      (2) This checklist is complete.
2. ●**If smoke or fumes are eliminated:**
   a. Land as soon as practical.
   b. This checklist is complete.

CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke or Fumes (Cont)

Electrical System Is Suspected Source

1. CABIN PWR Switch (if installed) — OFF.
2. Floodlights — On, for night operation.
3. EMER BAT Switches — Check, On.
4. EMER BUS Switch — EMER BUS.
5. Both START-GEN Switches — OFF.
6. Use standby attitude indicator and sensor display unit for attitude and directional reference.
7. Use standby airspeed indicator and altimeter.

NOTE

- All non-essential equipment is now off. Allow time for smoke and fumes to dissipate.
- *On aircraft 60-159 and subsequent and prior aircraft modified by SB 60-28-10,* the TOTAL fuel quantity window will display an error code. The fuel quantity for individual tanks remains valid.

8. Land as soon as practical.

If smoke or fumes continue, the malfunctioning system is connected to the EMER BUS or the EMER BAT supplies.

9. Both START-GEN Switches — GEN.
10. EMER BUS Switch — NORMAL.
11. EMER BAT Switches — OFF.
12. Use pilot's PFD for attitude reference.
13. R DC BUS 1 Circuit Breaker (R ELECTRICAL group) — Pull. Flap and normal gear operation is not available.
14. Circuit Breakers — Pull all EMER BUS (red ring on overlay) circuit breakers on copilot's panel.
15. R DC BUS 1 Circuit Breaker — Reset.

NOTE

Electrical power to all equipment on the EMER BAT supplies and copilot's EMER BUS is now off.

16. ● **If smoke or fumes dissipate,** the malfunctioning system is connected to the **copilot's** EMER BUS or the EMER BAT supplies.
    a. EMER BUS TIE (R ELECTRICAL group) — Leave pulled. Do not reset.
    b. Reset EMER BUS circuit breakers one at a time. Pause after resetting each circuit breaker to determine defective system. If high electrical loads and/or smoke and fumes occur, pull last circuit breaker reset.

CABIN FIRE Light Illuminated or Cabin/Cockpit Fire, Smoke or Fumes (Cont)

Electrical System Is Suspected Source (Cont)

c. EMER BAT Switches — On, one at a time. *If smoke and fumes recur,* set switch off.
d. Land as soon as practical.
e. This checklist is complete.

16. ● **If smoke or fumes continue,** the malfunctioning system is connected to the **pilot's** EMER BUS.
    a. EMER BAT Switches — On.
    b. L DC BUS 1 Circuit Breaker (L ELECTRICAL group) — Pull. Neither PRI nor SEC pitch trim is available.
    c. Circuit Breakers — Pull all EMER BUS (red ring on overlay) circuit breakers on pilot's panel.
    d. L DC BUS 1 Circuit Breaker — Reset.

NOTE

Electrical power to all equipment on the pilot's and copilot's EMER BUSes is now off.

    e. EMER BUS TIE (R ELECTRICAL group) — Leave pulled. Do not reset.
    f. Reset EMER BUS circuit breakers one at a time. Pause after resetting each circuit breaker to determine defective system. Whenever high electrical loads and/or smoke and fumes occur, pull last circuit breaker reset.
    g. Land as soon as practical.
    h. This checklist is complete.

Control System Jam

If the controls are not jammed, but there is a control axis malfunction present, perform **Pitch Axis Malfunction** or **Roll or Yaw Axis Malfunction** procedure, this section, to attempt to clear difficulty. If problem is not corrected, attempt to overpower jam. If jam can be overpowered, make a normal landing.

NOTE

For landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.

Aileron Jammed

NOTE

For landing, a wide runway with minimum turbulence and crosswind is recommended.

1. Autopilot — Disengage. Do not reengage.
2. Rudder — As required to control roll and track.

NOTE

- Yaw damper should be on to minimize roll oscillations.
- For prolonged flight in a sideslip, set XFLO VALVE switch to Open and both STBY PUMP switches to ON.

3. Land as soon as possible.
4. Refer to **Aileron Jammed Landing** procedure, Section IV.

Elevator Jammed

1. Autopilot — Disengage. Do not reengage.
2. Primary Pitch Trim — As required for pitch control.

NOTE

For landing, a shallow approach with flaps at 20° will minimize pitch change.

3. Land as soon as possible.
4. Refer to **Elevator Jammed Landing** procedure, Section IV.

Control System Jam (Cont)

Rudder Jammed

NOTE

For landing, a wide runway with minimum turbulence and crosswind is recommended.

1. Yaw Damper — Disengage. Do not reengage.
2. Ailerons — As required to control track.
3. Use asymmetric power if required to minimize sideslip.

NOTE

For prolonged flight in a sideslip, set XFLO VALVE switch to Open and both STBY PUMP switches to ON.

4. Land as soon as possible.
5. Refer to **Rudder Jammed Landing** procedure, Section IV.

Overspeed Recovery — Overspeed Horn Sounds

If VMO/MMO is exceeded, the overspeed warning horn will sound.

WARNING

Do not extend the spoilers, or operate with the spoilers deployed, at speeds above VMO/MMO due to significant nose-down pitching moment associated with spoiler deployment.

1. **Thrust Levers — IDLE.**
2. **Autopilot — Disengage.**
3. **Identify aircraft pitch and roll attitude.**

NOTE

- Attitude (particularly roll attitude) may be difficult to identify from visual and instrument references in an extreme nose-down condition.
- Do not apply elevator force until bank angle is reduced to less than 90°. A pull elevator force when the bank angle is greater than 90° will increase the nose-down attitude.

4. **Level wings.**
5. **Elevator and Pitch Trim — As required to raise the nose.**

WARNING

On any speed excursions beyond MMO, airframe buffet will be encountered. Increasing Mach number and/or g level will increase airframe buffet. Beyond MMO, a 1.5 g pull-up may be sufficient to excite aileron activity and the g level must be limited to that required to maintain lateral control.

If Mach or airspeed is severe or if pitch and/or roll attitude is extreme or unknown:

6. **LANDING GEAR Switch — DN.**

CAUTION

Minor damage to the landing gear doors may be experienced when the gear is lowered at very high speed. Do not retract landing gear for remainder of flight. After landing, a thorough inspection of the landing gear and doors for condition must be made.

NOTE

- Lowering the landing gear at high speed will increase drag and cause a moderate nose-up pitching moment which is easily controllable, but should be anticipated.
- Extending the landing gear has been flight tested to 0.85 MI and 320 KIAS. Analysis of flight test data indicates that this procedure is applicable at higher speeds.

Pitch Axis Malfunction

A nose-up pitch axis malfunction or nose-up pitch trim system runaway can result in extremely high pitch attitudes, heavy airframe buffet, and require control forces in excess of 75 pounds for recovery.

A nose-down pitch axis malfunction, nose-down pitch trim system runaway, or nose-down overspeed can result in extremely high airspeeds and require control forces in excess of 75 pounds for recovery.

A binding elevator is evidenced by difficulty in moving the control column when making manual pitch changes.

WARNING

- Do not extend spoilers during any nose-down pitch upset at any speed due to significant nose-down pitching moment associated with spoiler deployment.
- On any speed excursions beyond MMO, airframe buffet will be encountered. Increasing Mach number and/or g level will increase airframe buffet. Beyond MMO, a 1.5 g pull-up may be sufficient to excite aileron activity and the g level must be limited to that required to maintain lateral control.

NOTE

- Control pressures may be heavy. Copilot assistance is recommended with this procedure.
- The maximum altitude loss during an autopilot malfunction is:

  Cruise & Maneuvering ..... 700 feet
  ILS (two engine) ..... 70 feet
  (one engine) ..... 70 feet

1. **Control Wheel Master Switch (MSW) — Depress and hold.**

NOTE

- Yaw damper and autopilot will disengage.
- Stabilizer trim actuator (PRI and SEC pitch trim) will be inoperative while the switch is held.

2. **Attitude Control — As required to maintain aircraft control.**
3. **Thrust Levers — As required.**
4. **PITCH TRIM Switch (pedestal) — OFF.**

NOTE

MACH TRIM light may illuminate due to speed change with the PITCH TRIM selector switch OFF.

5. FD 1 and FD 2 Circuit Breakers (L and R AFCS group) — Pull.
6. Control Wheel Master Switch (MSW) — Release.

Pitch Axis Malfunction (Cont)

If flight conditions permit, isolate malfunction as follows:

NOTE

A trim system malfunction, with the flaps up, will be accompanied by the audio clicker. The autopilot and Mach trim systems also run pitch trim.

7. PITCH TRIM Switch (pedestal) — Operate to PRI then SEC to isolate malfunctioning trim system.
8. ● **If malfunction recurs in PRI pitch trim:**
   a. PITCH TRIM Switch (pedestal) — SEC.
   b. NOSE DN-NOSE UP Switch (pedestal) — Operate to retrim aircraft as required.
   c. PRI PITCH TRIM Circuit Breaker (L TRIM-FLT CONT group) — Pull.
   d. FD 1 and FD 2 Circuit Breakers — Reset.
   e. Autopilot and Yaw Damper — As desired.

NOTE

Mach trim will be inoperative. If autopilot is not engaged, do not exceed MMO (0.77 MI).

   f. This checklist is complete.

8. ● **If malfunction recurs in SEC pitch trim:**
   a. PITCH TRIM Switch (pedestal) — PRI.
   b. Control Wheel Trim Switch — Operate to retrim aircraft as required.
   c. SEC PITCH TRIM Circuit Breaker (R TRIM-FLT CONT group) — Pull.

NOTE

Autopilot trim will be inoperative.

   d. Yaw Damper — As desired.
   e. FD 1 and FD 2 Circuit Breakers — Reset.
   f. This checklist is complete.

8. ● **If malfunction does not recur:**
   a. PITCH TRIM Switch (pedestal) — PRI or SEC as desired.
   b. Maintain aircraft trim with selected trim system.

NOTE

Probable cause of malfunction was autopilot (if autopilot was engaged). **Do not engage autopilot**.

   c. Yaw Damper — As desired.
   d. FD 1 and FD 2 Circuit Breakers — Reset.
   e. This checklist is complete.

8. ● **If neither PRI nor SEC trim can be restored:**
   a. Yaw Damper — As desired.
   b. FD 1 and FD 2 Circuit Breakers — Reset.
   c. Refer to **Stabilizer Jammed Landing**, Section IV.
   d. This checklist is complete.

Roll or Yaw Axis Malfunction

1. **Control Wheel Master Switch (MSW) — Depress and hold.**

NOTE

- Yaw damper and autopilot will disengage.
- Roll trim, yaw trim, and rudder boost will be inoperative while the switch is held.

2. **Attitude Control — As required to maintain aircraft control.**
3. ***If control force continues,* Airspeed — Reduce to minimize force.**
4. ROLL TRIM and YAW TRIM Circuit Breaker (L TRIM-FLT CONT group) — Pull affected axis.
5. RUDDER BOOST Switch — OFF.
6. Control Wheel Master Switch (MSW) — Release.
7. ●If **malfunction was isolated to yaw damper:**
   a. ROLL TRIM and YAW TRIM Circuit Breakers — Reset.
   b. Autopilot — As desired.
   c. Yaw Damper — Ensure disengaged.
   d. This checklist is complete.
7. ●If **malfunction was isolated to autopilot:**
   a. Do not engage autopilot.
   b. ROLL TRIM and YAW TRIM Circuit Breakers — Reset.
   c. Yaw Damper — As desired.
   d. This checklist is complete.
7. ●**If malfunction was isolated to rudder boost system:**
   a. RUDDER BOOST Switch — Leave OFF.
   b. ROLL TRIM and YAW TRIM Circuit Breakers — Reset.
   c. Autopilot — As desired.
   d. Yaw Damper — As desired.
   e. This checklist is complete.
7. ●**If malfunction was isolated to roll or yaw trim system:**
   a. Use asymmetric thrust, fuel imbalance, and yaw damper as required to minimize mistrim.
   b. Land as soon as practical.
   c. This checklist is complete.

NOTE

A normal approach and landing can be made with only light control forces to overcome full roll or yaw trim.

FUEL PRESS Light Illuminated in Flight

Illumination of a red FUEL PRESS warning light is an indication of loss of fuel pressure to the engine.

Affected engine:

1. STBY PUMP Switch — On.
2. IGNITION Switch — On.
3. XFLO VALVE — Closed.
4. FUSELAGE Tank Switches — As follows:
   a. GRVTY XFR Switch — Deselect GRVTY XFR.
   b. NORM XFR Switch — Deselect NORM XFR.
   c. AUX XFR Switch — Deselect AUX XFR.
   d. FILL Switch — Deselect FILL.
5. JET PUMP — OFF.

NOTE

With the jet pump off, unusable fuel in the corresponding wing will increase to approximately 400 pounds (181 kg) when the aircraft is in a 3° to 5° nose-up cruise condition. Avoid prolonged nose up attitudes.

6. ● **If the FUEL PRESS light goes out,** normal flight can be continued.
   a. IGNITION Switch — OFF.
   b. Fuselage fuel transfer may be accomplished at 51,000 feet or lower using **Rapid Transfer Procedure** page 2-96 (both normal and auxiliary transfer pumps) to transfer fuselage tank fuel. Stop fuel transfer when fuselage tank quantity indicates 200 pounds (91 kg).

NOTE

Fuselage fuel transfer deactivates the wing standby pumps. However, use of both fuselage transfer pumps will provide sufficient engine fuel pump inlet pressure.

   c. This checklist is complete.

6. ● **If the FUEL PRESS light does not go out,** flight can be continued at altitude if engines are operating properly.
   a. Make thrust lever movements slow and cautious at high altitudes.
   b. This checklist is complete.

NOTE

The altitude at which the engine-driven fuel pump will suction feed sufficient fuel to supply the engine will vary depending upon fuel temperature and type.

Ditching

Ditching of this aircraft has not been demonstrated, and this aircraft has not been certified for ditching under the provisions of FAR 25. However, the following procedure should enhance the probability of a successful ditching.

Plan the descent to ensure minimum fuel remaining and improve buoyancy. Ensure sufficient fuel for controlled, power-on approach. This aircraft exhibits good buoyancy properties, floating near level or slightly tail low. After ditching, the airplane may remain afloat for some time if it does not sustain serious damage on landing.

1. **If time and conditions permit,** perform the following; otherwise, go to step 2:
   a. Head toward nearest land or vessel.
   b. Notify controlling agency.
   c. Transponder — Emergency 7700.
   d. ELT Switch (if installed) — ON.
   e. Crew Life Vests — On.
   f. Brief passengers as required:
      (1) Use of available flotation equipment.

NOTE

Inform passengers not to inflate life vests while inside aircraft.

      (2) Location and operation of emergency exits. **Do not** open lower half of cabin door at any time.
      (3) All loose items — Secure.
      (4) Emergency landing brace position.
      (5) Several impacts may be felt, depending on the sea conditions. **Do not** release seat belts after first impact is felt.
   g. NO SMOKING/FASTEN SEAT BELTS Switch — On.

NOTE

If the CABIN PWR switch (if applicable) has been selected OFF, the NO SMOKING/FASTEN SEAT BELTS signs and tone will be disabled. Verbal notification to the passengers is required.

   h. Go to step 2.
2. LANDING GEAR Switch — UP.
3. Flaps — DN.

NOTE

The landing gear warning horn will sound with landing gear up and flaps down.

4. CAB AIR Switch — OFF. The aircraft should be depressurized prior to landing.

Ditching (Cont)

5. EMER BAT Switches — OFF.
6. Perform normal power-on approach at VREF.

CAUTION

Plan landing direction as follows:

a. Calm Sea — Into winds.
b. Moderate Swells — Parallel to swells.
c. High Winds — Into wind, attempting to land on upwind (far) side of swell.

7. Thrust Levers — CUTOFF at touchdown.
8. ENG FIRE PULL T-Handles — Pull.
9. BATTERY Switches — OFF.
10. Seat Belts — On until aircraft comes to a complete stop.
11. Emergency Exit(s) — Open after airplane comes to a complete stop. **Do not** open lower half of cabin door at any time.

Emergency Braking

In the event of a normal brake system failure, emergency brakes can be used to stop the airplane. When using emergency braking, anti-skid protection is not available, and the anti-skid OFF corrections presented in Section V will be applicable.

1. **Pull EMER BRAKE handle out of recess.**
2. **Push downward on handle to apply brake pressure.**

NOTE

The EMER BRAKE handle must be pushed down approximately 2 inches (5 centimeters) before braking action begins. To realize the optimum benefit from the emergency braking system, the following technique should be employed:

a. Apply the brakes smoothly with small movements to produce improved feel and reduce the probability of tire skid. Do not pump the brake handle.
b. Avoid taxiing if sufficient brake pressure is not available.

3. Rudder and/or nose wheel steering — As required for directional control.

Emergency Evacuation

1. **Stop the aircraft.**
2. **PARKING BRAKE — Set.**
3. **Thrust Levers — CUTOFF.**
4. **EMER DEPRESS Switch — Lift guard and depress.**
5. **Notify controlling agency.**
6. ●*If an engine fire is suspected:*
   a. **Applicable ENG FIRE PULL Handle — Pull.**
   b. **Either ENG EXT ARMED Light — Depress.**
   c. **Other ENG FIRE PULL Handle — Pull.**
   d. **BATTERY Switches — OFF.**
   e. **EMER BAT Switches — OFF.**
   f. **Evacuate the aircraft.**
6. ●*If engine fire is not suspected:*
   a. **Both ENG FIRE PULL Handles — Pull.**
   b. **BATTERY Switches — OFF.**
   c. **EMER BAT Switches — OFF.**
   d. **Evacuate the aircraft.**



Use emergency exits as follows:
Cabin Entry Door — Open and exit aircraft. The upper door is openable with the landing gear retracted.
Aft Cabin Door — Open and exit using the wing step area.

Forced Landing — Both Engines Inoperative

The recommended airplane best glide speed is VREF + 50 with the gear and flaps up. The still-air gliding distance is approximately 1.5 nm per 1000 feet of altitude.

1. **If time permits,** perform the following; otherwise, go to step 2:
   a. Transponder — Emergency 7700.
   b. Advise controlling agency.
   c. Prepare passengers for emergency landing.
   d. TCAS (if installed) — Select TA Only.
   e. Go to step 2.
2. TERR Switch (if installed) — Select INHIBIT
3. HYD PUMP Switch — On.
4. LANDING GEAR Switch — DN.
5. Flaps — DN.
6. ENG FIRE PULL Handles — Pull.
7. START-GEN Switches — OFF.
8. BATTERY Switches — OFF.
9. Touch down in normal landing attitude.

After airplane comes to a complete stop:

10. EMER BAT Switches — OFF.
11. Evacuate the aircraft:
    a. **Cabin Entry Door** — Open and exit aircraft. The upper door is openable with the landing gear retracted.
    b. **Aft Cabin Door** — Open and exit using the wing step area.

Stall Warning Activates

The stall warning system has sensed a limit angle of attack. The red L and/or R STALL lights will flash, the control column stick shaker will activate and the angle-of-attack indication will be in the yellow approaching the red.



If the aircraft is allowed to decelerate below stall warning angle of attack, priority must be given to immediately reducing the angle of attack rather than attempting to maintain altitude. Stall recovery from typical cruise altitudes and other relatively low thrust conditions will require a significant loss of altitude.

1. **Lower the pitch attitude to reduce the angle of attack.**
2. **Thrust Levers — Set to takeoff power.**
3. **Level the wings.**
4. **Accelerate out of the stall condition.**

Aborted Takeoff

1. **Wheel Brakes — Apply.**
2. **Thrust Levers — IDLE.**
3. **Spoilers — EXT.**
4. Thrust Reversers — Deploy, if necessary. Check for TR DEPLOY lights illuminated
5. *If none of the TR lights are illuminated,* Both Thrust Reverser Levers — Stow.

NOTE

The normal sequence of each engine's annunciators are as follows:

- Green TR ARM — Thrust reverser ready to deploy.
- Green TR ARM and amber TR UNLOCK — Thrust reverser in transit.
- Green TR ARM and white TR DEPLOY — Thrust reverser fully deployed (reverse thrust greater than idle is possible when both engine's thrust reversers have been fully deployed).

WARNING

- A damaged squat switch (or other failures) may cause the thrust reverser autostow system to activate (both engine's clamshell doors will stow), resulting in **FORWARD** thrust, ranging from idle to near takeoff power, depending on thrust reverser **LEVER** position. If this occurs, thrust reverser **LEVERS** must be stowed immediately.
- Squat switch failure with the thrust reversers deployed will be indicated by the white TR DEPLOY lights extinguishing and the amber TR UNLOCK lights illuminating for several seconds, then extinguishing. The green TR ARM lights will flash during the transition, then extinguish. **In summary, the absence of any TR lights indicates forward thrust**. There may also be a change in acceleration as the engines transition from reverse thrust to forward thrust.

Aborted Takeoff (Cont)

6. ● **If rejected takeoff was made at a weight above the turn-around brake energy weight** (see applicable **LANDING WEIGHT LIMIT** chart in Section V), observe the **Turn-Around Limits** in Section I. This checklist is complete.
6. ● **If rejected takeoff was made at a weight above the landing maximum brake energy weight** (see applicable **LANDING WEIGHT LIMIT** chart in Section V), see maintenance personnel to perform the high energy stop inspection. This checklist is complete.

NOTE

If the stop was conducted above the landing maximum brake energy limit, it is recommended that the PARKING BRAKE be released and chocks used. This will increase brake cooling efficiency and reduce the possibility of wheel fuse plug release and brake/tire fire.

Takeoff Warning Horn Activates

The takeoff monitor warning will sound during ground operation when the right thrust lever is advanced to the MCR detent or above and one or more of the following conditions exist:

- Thrust reverser unlocked or deployed
- Flaps not set for takeoff
- Spoilers not retracted
- Pitch trim not in a safe position for takeoff
- Parking brake not released

1. Wheel Brakes — Apply.
2. Thrust Levers — IDLE.
3. After stopping, check takeoff configuration.

Inadvertent Stow of Thrust Reverser After a Crew-Commanded Deployment

1. **Maintain control with rudder, aileron, nose-wheel steering, and brakes.**
2. **Both Thrust Reverser Levers — Stow.**

WARNING

- A damaged squat switch (or other failures) may cause the thrust reverser autostow system to activate (both engine's clamshell doors will stow), resulting in **FORWARD** thrust, ranging from idle to near takeoff power, depending on thrust reverser **LEVER** position. If this occurs, thrust reverser **LEVERS** must be stowed immediately.
- Squat switch failure with the thrust reversers deployed will be indicated by the white TR DEPLOY lights extinguishing and the amber TR UNLOCK lights illuminating for several seconds, then extinguishing. The green TR ARM lights will flash during the transition, then extinguish. **In summary, the absence of any TR lights indicates forward thrust**. There may also be a change in acceleration as the engines transition from reverse thrust to forward thrust.

Inadvertent Thrust Reverser Deployment During Takeoff

An inadvertent thrust reverser deployment during takeoff will be indicated by illumination of the amber TR UNLOCK and/or white TR DEPLOY lights with the affected engine rolling back to idle thrust. Also, both the white and amber ENG CMPTR lights will illuminate when the aircraft becomes airborne.

Below V_1 Speed

1. **Wheel Brakes — Apply.**
2. **Thrust Levers — IDLE.**
3. **Spoilers — EXT.**

NOTE

Directional control will be improved with both thrust reversers deployed.

Above V_1 Speed

1. **Rudder and Ailerons — As required for directional control.**
2. **Accelerate to V_R. Keep nose wheel on the ground.**
3. **Rotate at V_R; Climb at V_2.**
4. **GEAR — UP, when positive rate of climb is established.**
5. **When clear of obstacles, accelerate to V_2 + 20 and retract flaps.**
6. Affected Engine Thrust Lever — IDLE.

NOTE

The FADEC will automatically reduce the thrust to idle if a thrust reverser primary latch unlock is detected. However, the engine thrust lever will not move.

7. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) — Set.
8. ● **If TR UNLOCK and TR DEPLOY lights do not go out,** shut down affected engine. Refer to **Engine Shutdown In Flight** and **Thrust Reverser Deployed Landing** procedures, Section IV. This checklist is complete.

8. ● **If TR UNLOCK and TR DEPLOY lights go out and both white and amber ENG CMPTR lights go out,** Affected Thrust Lever — As required. This checklist is complete.

TR UNLOCK / TR DEPLOY and ENG CMPTR Lights Illuminated in Flight

An inadvertent thrust reverser deployment in flight will be indicated by illumination of the amber TR UNLOCK and/or white TR DEPLOY lights. Also, both the white and amber ENG CMPTR lights will illuminate and the affected engine will roll back to idle thrust. The autostow function will attempt to stow the reverser doors.

On aircraft 60-041 & subsequent and prior aircraft modified by SB 60-78-2, illumination of an amber TR UNLOCK light without engine roll-back indicates a secondary latch is unlocked. For this condition, refer to **TR UNLOCK Light Illuminated** procedure, Section IV.

1. Maintain control with rudder, aileron, and elevator.
2. Affected Engine Thrust Lever — IDLE.

NOTE

The FADEC will automatically reduce the thrust to idle if a thrust reverser primary latch unlock is detected. However, the engine thrust lever will not move.

3. Airspeed — Reduce to 200 KIAS or 0.70 MI, whichever is less.
4. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) — Set.
5. Affected Thrust Reverser Lever — Stow.
6. ● **If TR UNLOCK and TR DEPLOY lights do not go out,** shut down affected engine. Refer to **Engine Shutdown In Flight** and **Thrust Reverser Deployed Landing** procedures, Section IV. This checklist is complete.
6. ● **If TR UNLOCK and TR DEPLOY lights go out and both white and amber ENG CMPTR lights go out,** Affected Thrust Lever — As required. This checklist is complete.

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Introduction

The procedures in this section of the manual have been developed by Learjet Inc. for certification of this aircraft. This section contains those operating procedures requiring the use of special systems and/or alternate use of regular systems which, if followed, will maintain an acceptable level of airworthiness or reduce operational risk resulting from a failure condition.

The procedures located in this section supplement Normal Procedures when a failure condition exists. Use of Normal Procedures should be continued when applicable. Sound judgement as well as thorough knowledge of the aircraft, its characteristics, and the flight manual procedures are essential in the handling of any failure condition.

OVERRIDING CONSIDERATIONS

In all emergencies, the overriding consideration must be to:

- Maintain Airplane Control
- Analyze the Situation
- Take Proper Action

Terminology

Some abnormal procedures require that a landing be made as soon as practical. Refer to emergency procedures for complete definitions of the terms “land as soon as possible” and “land as soon as practical.”

ALC LOW Light Illuminated

Illumination of the amber ALC LOW light indicates the alcohol level in the windshield alcohol anti-ice reservoir is low.

1. WSHLD ALC Switch — OFF when alcohol stops flowing.
2. After landing, assure alcohol reservoir is properly replenished.

Engine Ice Ingestion

Engine ice ingestion can result in fan damage and abnormal engine operation. Engine ice ingestion can be suspected whenever ice is shed from the wing, windshield, or nacelle. This may occur when anti-ice systems are energized after significant ice accumulation has occurred on the above surfaces. Ice ingestion may be evident by a change in engine sound or frequency, audible report, sharp rise in ITT, or RPM hang-up.

Experience to date has shown that, if proper procedures are observed, there is a very high probability of satisfactory engine operation after experiencing foreign object damage from ice in the engine fan. Such damage can reduce the compressor stall margin so that the engine could become more sensitive to rapid thrust lever movements, inlet pressure profile variation due to maneuvering, and high RPM operation. Compressor stalls may result in engine flameout.

1. IGNITION Switches — On. Leave On for the duration of the condition.
2. Thrust Lever movements should be slow and cautious.
3. Engine RPM — Set as low as possible. Maintain sufficient RPM for anti-icing heat and cabin pressure.
4. Avoid any abrupt changes in pitch, yaw, or roll.
5. To determine extent of engine damage due to ice ingestion, proceed as follows:
   a. Thrust Levers (one at a time) — Retard to IDLE. Then cautiously advance and check for any vibration or abnormal noise on each engine.



If compressor stall is encountered, retard thrust lever until smooth operation is obtained. (If any of the fan blades have been damaged, the noise level and frequency will increase with an increase of RPM).

   b. I*f either engine flames out,* airstart in accordance with the **Airstart** procedure, this section. After restart, repeat step 5, but stay below engine speed at which engine flamed out.
   c. *If ice damage has been experienced,* land as soon as practical and stay within the operating limitations of engine as defined by this procedure.



Inspect engine for damage any time inadvertent icing conditions have been encountered.

Inadvertent Icing Encounter

Before Heavy Ice Accumulation Occurs

1. All Anti-Ice Systems — Activate immediately to preclude ice accumulation.

If approach and landing must be made with any amount of ice on the airframe:

2. Do not extend flaps beyond 20°.
3. Use landing procedure for a wing and stabilizer heat failure. Refer to Abnormal Landings, this section.

WARNING Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

NOTE Ice accumulation on the stabilizer can cause deterioration in trim speeds, elevator buffeting, changes in elevator forces, and control column oscillations/pulsing. During flight tests, control column oscillations and pulsing tended to increase in intensity with increases in power. Low speed flight should be approached with care so that detection of abnormal flying qualities can be obtained.

Heavy Ice Accumulation Has Occurred

If en route and destination temperatures remain below freezing, consideration should be given to landing with ice on the wings.

1. ● **If landing with ice on the wings:**
   a. WING HEAT Circuit Breaker (R ANTI-ICE group) — Pull. The WING TEMP indicator will be inoperative.
   b. STAB WING HEAT Switch — STAB WING HEAT. This will provide stabilizer heat without activating the wing heat.
   c. Use landing procedure for a wing heat failure. Refer to **Wing Heat Failure Landing**, this section.

1. ● **If attempting to remove ice accumulation:**
   a. IGNITION Switches — On.
   b. Engine RPM — Set as low as possible. Maintain sufficient RPM for anti-icing heat and cabin pressure.
   c. NAC HEAT Switch (for one engine) — On; wait until satisfactory engine operation is apparent, then opposite engine NAC HEAT Switch — On; Observe NAC HT light out for operation of engine anti-ice.
   d. After satisfactory engine operation is apparent, STAB WING HEAT Switch — On.
   e. After satisfactory engine operation is apparent, WSHLD HEAT Switch — As required.

NAC HT Light Illuminated

A failure of the nacelle heat system (bleed air) is indicated by illumination of the amber L or R NAC HT light. Two types of failures are annunciated with these lights: 1) Uncommanded application of nacelle heat, and 2) the failure of nacelle heat to activate when commanded.

Affected engine:

1. NAC HEAT Circuit Breaker (ANTI-ICE group) — Pull and reset.
2. ●**If NAC HT light does not go out:**
   a. ■**If associated NAC HEAT switch is OFF**, Engine RPM — Reduce to minimum required.
   a. ■**If associated NAC HEAT switch is On**, Engine RPM — Increase to improve airflow. Fly out of icing conditions if possible.
2. ●**If NAC HT light goes out**, this checklist is complete.

PITOT HT Light Illuminated

Illumination of the PITOT HT light indicates that one or more of the pitot-static mast heaters are inoperative or one or both PITOT HEAT switches are OFF.

1. PITOT HEAT Switches — Check, On.
2. L PITOT HEAT, R PITOT-STALL-TAT HEAT, and STANDBY PITOT HEAT Circuit Breakers (ANTI-ICE group) — Set.
3. Cross-check the three pitot-static systems.

NOTE

- The overspeed warning horn will sound if either the pilot's or copilot's airspeed indication is above the overspeed cue (V_{MO}/M_{MO}).
- The standby pitot-static mast may be visible from the copilot's seat. Visually check mast for ice or damage.

4. *If illumination of the PITOT HT light is accompanied by erroneous pitot-static indications,* refer to **Loss of Air Data or Erroneous Indications** procedure, this section.

STAB HT Light Illuminated in Flight

With the STAB WING HEAT switch On, a failure of any stabilizer heating element is indicated by illumination of the amber STAB HT light while in flight. The remaining elements will continue to operate.

Ice accumulation on the stabilizer can cause deterioration in trim speeds, elevator buffeting, changes in elevator forces, and control column oscillations/pulsing. During flight tests, control column oscillations and pulsing tended to increase in intensity with increases in power. Low speed flight should be approached with care so that detection of abnormal flying qualities can be obtained.

1. STAB HEAT Circuit Breaker (R ANTI-ICE group) — Set.
2. ● **If STAB HT light does not go out:**
   a. Fly out of icing conditions if possible.
   b. Do not extend flaps beyond 20°.
   c. Refer to **Stabilizer Heat Failure Landing** procedure, this section.
2. ● **If STAB HT light goes out**, this checklist is complete.

WING HT Light Illuminated

If the amber WING HT light illuminates, the wing heat system is not maintaining the temperature of the leading edge in the normal operating range. The light will annunciate both the underheat (if STAB WING HEAT switch is on) and overheat conditions. It is normal for the light to illuminate upon initial activation of the wing heat system until the leading edge temperature reaches the normal operating range.

1. WING TEMP Indicator — Check.
2. ● **If WING TEMP Indicator is approaching or in the blue band and/or either wing shows signs of ice accumulation**, a wing underheat condition exists:
   a. WING HEAT Circuit Breaker (R ANTI-ICE group) — Set.
   b. Engine RPM — Adjust as required to maintain WING TEMP indicator in the green band.
   c. **If WING HT light does not go out and the WING TEMP indicator remains in the blue range and/or visual indications of ice accumulation**, fly out of icing conditions.
   d. Go to step 3.

2. ● **If WING TEMP Indicator is approaching or in the red band**, a wing overheat condition exists:
   a. WING HEAT Circuit Breaker (R ANTI-ICE group) — Pull. The WING TEMP indicator will be inoperative.
   b. STAB WING HEAT Switch — STAB WING HEAT. This will provide stabilizer heat without activating the wing heat.
   c. Fly out of icing conditions.
3. *If landing with ice on the wings,* use landing procedure for a wing heat failure. Refer to **Wing Heat Failure Landing**, this section.

WARNING

Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

Windshield Heat Failure

With the WSHLD HEAT system activated, a failure is indicated by the formation of ice on the heated portion of the windshield.

1. WSHLD HEAT Circuit Breaker (R ANTI-ICE group) — Set.
2. WSHLD HEAT Switch — WSHLD HEAT (full airflow).
3. Engine RPM — Increase as required to improve airflow.
4. *If system fails to anti-ice the windshield:*
   a. WSHLD ALC Switch — WSHLD ALC if required. This will anti-ice the pilot's windshield only and give alcohol flow for approximately 45 minutes.
   b. WSHLD ALC Switch — OFF when alcohol is depleted or when out of icing conditions.

WS DEFOG Light Illuminated

NOTE

Any illumination (including momentary flashes) of the L or R WS DEFOG light, other than upon initial activation, should be considered a malfunction. A momentary flash indicates cycling of the over-temperature protection circuit and is not normal.

Illumination of the amber L or R WS DEFOG light indicates an over-temperature condition (approximately 150°F [66°C] or more), under-temperature condition (approximately 85°F [29°C] or less) or loss of AC or DC power. Illumination of the WS DEFOG lights, upon initial activation when the windshield temperature is below approximately 85°F (29°C), does not indicate a malfunction. Determination of an overheat or underheat condition can be made by feeling the indicated windshield. If an under-temperature condition occurs, deactivation of the system is not required. In the event an overheat condition persists for more than 10 minutes, it is desirable to deactivate the windshield defog system.

1. ● **If an underheat condition exists:**
   a. Applicable WSHLD DEFOG Circuit Breakers (ANTI-ICE group) — Set both AC and DC circuit breakers.
   b. Go to step 2.

1. ● **If an overheat condition exists:**
   a. L or R WSHLD DEFOG Circuit Breaker (ANTI-ICE group) — Pull both AC and DC circuit breakers.
   b. Check that affected windshield does not continue to heat.
   c. Go to step 2.

WS DEFOG Light Illuminated (Cont)

2. *If descending with an inoperative defog system into conditions requiring defogging:*
   a. WSHLD HEAT Switch — WSHLD HEAT.
   b. Cockpit Shoulder and Ankle Eyeball Outlets — Open.
   c. CREW COLD-HOT Control — HOT.
   d. At FL 350:
      (1) Cabin AUTO-MAN Switch — MAN and Cabin COLD-HOT Knob — COLD.
      (2) COOL Switch — COOL.
   e. Leave CAB AIR and WSHLD HEAT on until shutdown.

WSHLD OV HT Light Illuminated

Illumination of the amber WSHLD OV HT light indicates the bleed air temperature in the windshield nozzles has exceeded the system limits. Airflow should automatically shut off when the WSHLD OV HT light illuminates.

If airflow did not shut off when WSHLD OV HT light illuminated:

1. WSHLD HEAT Switch — OFF.

AC Bus Failure

Each AC bus is intended to be powered by only one inverter. Therefore, the AC BUS TIE Switch (copilot's circuit breaker panel) is normally in the OPEN (down) position isolating the left and right AC buses. The AC BUS TIE Switch should only be closed after setting one of the INVERTER Switches to OFF.

An AC bus failure is indicated by illumination of the amber ELEC PWR annunciator, an amber or red light on the electric power monitor and flashing of the associated VAC display. The most likely cause is either an inverter failure or open AC BUS circuit breaker.

1. Affected INVERTER Switch(es) — OFF.
2. AC BUS TIE Switch — Ensure switch is in the OPEN (down) position.
3. Affected INV and AC BUS Circuit Breakers — Pull and reset.
4. Load on Affected AC Bus(es) — Reduce. Refer to table.
5. Affected INVERTER Switch(es) — On.
6. ● **If AC power is not regained:**
   a. Affected INVERTER Switch(es) — OFF.
   b. *If it is desired to power loads on the failed bus,* AC BUS TIE Switch — Switch to closed (up) position. Both AC buses will be powered by the operating inverter. If the BUS TIE switch opens, leave it open.

   AC circuit breakers are denoted by a white circle on the panel overlay.

AC buses and their associated loads

L AC BUS	R AC BUS
- AFCS -	**- TRIM-FLT CONT -**
MACH TRIM	SPOILERON
- ANTI-ICE -	NOSE STEER
L WSHLD DEFOG	**- ANTI-ICE -**
	R WSHLD DEFOG
	- AVIONICS -
	NOSE FAN

NOTE

- The above circuit breaker listing does not include circuit breakers added as a result of optional equipment installations.

AC Bus Failure (Cont)

NOTE

- The L and R WSHLD DEFOG systems are not powered from the L and R AC BUS circuit breakers. The L WSHLD DEFOG system is normally powered by the left inverter and the R WSHLD DEFOG system is normally powered by the right inverter. Should one inverter fail, both WSHLD DEFOG systems will be powered by the remaining inverter (failed INVERTER switch must be set to OFF).
- If a total AC power failure occurs, all of the equipment in the preceding table will be inoperative. Spoilers will be inoperative in flight and may be inoperative during ground operations. **Do not exceed 38,000 feet**.

c. This checklist is complete.

6. ●**If AC power is regained,** this checklist is complete.

CUR LIM Light Illuminated

A battery charging bus current limiter failure is made evident by illumination of the amber CUR LIM light. Should a battery charging bus current limiter fail:

NOTE

Generator loading may not read equally.

1. Check electric power monitor. Failure of both 275-amp current limiters is indicated if VDC reading (battery voltage) is 25 VDC or less and/or AMP readings (generator load) do not increase when COOL, AUX HT or STAB HEAT is momentarily energized.
2. ● **If one 275-amp current limiter has failed:**
   a. Electrical Load — Reduce if required to observe generator limits.
   b. Continue flight but monitor electrical loads.
   c. Go to step 3.
2. ● **If both 275-amp current limiters have failed:**

NOTE

Electrical power to the battery charging bus is being supplied by the ship's batteries. If the batteries become depleted, primary pitch trim system will be inoperative.

   a. Electrical load on battery charging bus — Reduce.
      (1) AUX HT Switch — OFF.
      (2) COOL Switch — OFF.
      (3) RECOG/PULSE Switch — OFF.
      (4) STAB HEAT Circuit Breaker (R ANTI-ICE group) — Pull.
      (5) Unnecessary interior equipment — Off or circuit breakers pulled.
3. After landing, replace failed 275-amp current limiter(s) prior to next flight.

DC Bus Failure

The DC BUS TIE Switches (copilot's circuit breaker panel) are normally in the OPEN (down) position isolating the left and right DC buses.

The EMER BUS TIE (copilot's circuit breaker panel) is only functional when the EMER BUS switch is positioned to EMER BUS.

L or R DC BUS 1, 2 or 3 Circuit Breaker Opens in Flight

1. Affected BUS TIE Switch — Ensure switch is in the OPEN (down) position.
2. Electrical Load on Affected Bus — Reduce. Refer to table.
3. Affected DC BUS Circuit Breaker — Set.

NOTE

Wait at least one minute cooling time before attempting to set DC BUS circuit breakers.

4. ● **If DC BUS circuit breaker holds:**
   a. Add loads only as necessary for safe operation.
   b. This checklist is complete.

4. ● **If DC BUS circuit breaker does *not* hold:**
   a. ■ **If attempting recovery of DC BUS 1, 2, or 3:**
      (1) Reduce load on both affected DC buses to a minimum.
      (2) Affected BUS TIE Switch — Switch to closed (up) position. If the BUS TIE switch opens, leave it open.
      (3) This checklist is complete.
   a. ■ **If *not* attempting recovery of a DC BUS**, this checklist is complete.

NOTE

DC BUS 4 is custom designed for each airplane to accommodate optional equipment; therefore, the following circuit breaker listings do not include circuit breakers on DC BUS 4 or those added as a result of optional equipment installations. Additionally, a bus tie is not provided for the left and right DC BUS 4.

Both L and R DC BUS 1 Circuit Breakers Open in Flight

1. DC BUS 1 TIE Switch — Ensure switch is in the OPEN (down) position.
2. Electrical Load on L and R DC BUS 1 — Reduce. Refer to table.
3. L and R DC BUS 1 Circuit Breakers — Set, one at a time.

NOTE

Wait at least one minute cooling time before attempting to set circuit breakers.

DC Bus Failure (Cont)

Both L and R DC BUS 1 Circuit Breakers Open in Flight (Cont)

4. ●**If either or both DC BUS 1 circuit breaker(s) holds:**
   a. Add loads only as necessary for safe operation.
   b. Land as soon as practical.
   c. This checklist is complete.

4. ●**If neither DC BUS 1 circuit breaker holds:**
   a. EMER BAT Switches — Check, On.
   b. EMER BUS Switch — EMER BUS.

NOTE

- The generators will provide electrical service to DC BUS 2, 3 and 4. The main batteries will provide electrical service to those circuits denoted by red rings on the circuit breaker overlays. Fully charged main batteries should power the minimum electrical equipment for night instrument flight for at least 1 hour.
- The main batteries will not be charged while operating in EMER BUS mode. Occasionally switching back to NORMAL will allow the batteries to be charged, but results in the loss of service to all DC BUS 1 loads.

   c. ■**On *aircraft 60-001 thru 60-248,*** Airspeed (Standby Indicator) — 0.75 MI or below.
   c. ■**On *aircraft 60-249 & Subsequent,*** Airspeed (Standby Indicator) — 0.77 MI or below.
   d. Altitude — 38,000 feet or below.

NOTE

When using the standby indications (ESIS), refer to **Airspeed and Mach Calibration — Standby System** and **Altitude Position Correction — Standby System**, in Section V.

   e. *If there is fuel in the fuselage tank,* GRVTY XFR Switch — Select ON.

NOTE

With GRVTY XFR selected, approximately 350 pounds (159 kg) of fuselage fuel will be unusable.

   f. Land as soon as practical.
   g. Before landing, GRVTY XFR Switch — Select Off.

DC Bus Failure (Cont)

Both L and R DC BUS 2 Circuit Breakers Open in Flight

1. DC BUS 2 TIE Switch — Ensure switch is in the OPEN (down) position.
2. Electrical Load on L and R DC BUS 2 — Reduce. Refer to table.
3. L and R DC BUS 2 Circuit Breakers — Set, one at a time.

NOTE

Wait at least one minute cooling time before attempting to set circuit breakers.

4. ● **If either or both DC BUS 2 circuit breaker(s) holds:**
   a. Add loads only as necessary for safe operation.
   b. Land as soon as practical.
   c. This checklist is complete.
4. ● **If neither DC BUS 2 circuit breaker holds:**
   a. Land as soon as practical.

Both L and R DC BUS 3 Circuit Breakers Open in Flight

1. DC BUS 3 TIE Switch — Ensure switch is in the OPEN (down) position.
2. Electrical Load on L and R DC BUS 3 — Reduce. Refer to table.
3. L and R DC BUS 3 Circuit Breakers — Set, one at a time.

NOTE

Wait at least one minute cooling time before attempting to set circuit breakers.

4. ● **If either or both DC BUS 3 circuit breaker(s) holds:**
   a. Add loads only as necessary for safe operation.
   b. Land as soon as practical.
   c. This checklist is complete.
4. ● **If neither DC BUS 3 circuit breaker holds:**
   a. Land as soon as practical.

DC Bus Failure (Cont)

DC buses and their associated loads (pilot's circuit breaker panel):

L DC BUS 1		L DC BUS 2	L DC BUS 3
- ELECTRICAL -	**- ANTI-ICE -**	**- AFCS -**	**- AFCS -**
ELEC PWR MON	L WSHLD DEFOG	PITCH SERVO	AP 1
EMER BAT 1	L NAC HEAT	ROLL-YAW SERVO	**- FUEL -**
- AFCS -	**- ENVIRONMENT -**	**- L ENGINE -**	L STBY-SCAV PUMP
FD 1	FREON CONTROL⑥	L ENG CH A ④	**- L ENGINE -**
- FUEL -	COOL CONTROL⑦	L ENG CH B ⑤	L OVSP
FUEL QTY PWR 1	TEMP CONTROL IND	L IGN CH A	L START
FUS TANK XFR PUMP	BLEED AIR OV HT	**- LIGHTS -**	L IGN CH B
L JET PUMP-XFR VALVE	CABIN PRESS IND	NAV LTS	ENG SYNC
XFLO VALVE	MANUAL TEMP CONTROL	**- ENGINE INSTR -**	L TR AUTO STOW
- L ENGINE -	**- INSTRUMENTS -**	L N1	L ENGINE VIB MON
L FIRE DETECT	AHS 1	L FUEL FLOW	**- LIGHTS -**
L FIRE EXT	ADC-ARP 1	**- INSTRUMENTS -**	L INSTR LTS
L TR CONT	MFD 1	PFD 1	L EL LTS
L FW SOV	SDU PWR 1	LO SPD WARN 1	**- TRIM-FLT CONT -**
L ENG CH B ④	**- AVIONICS -**	L CLOCK	ROLL TRIM
L ENG CH A ⑤	IAPS TEMP 1	EFIS CTL 1	YAW TRIM
- LIGHTS -	AUDIO 1	**- AVIONICS -**	**- ENGINE INSTR -**
FLOOD LTS	COMM 1	DAU 1	L OIL TEMP-PRESS
CENTER PANEL-PED LTS	ADF 1	FLITEFONE	**- ANTI-ICE -**
WARN LTS	RTU 1	SELCAL	L STALL VANE HEAT
- TRIM-FLT CONT -	NAV 1	OSS-GPS 1 ①	L ICE DETECT LIGHT
PRI PITCH TRIM	DME 1	OSS 1 ② ③	**- ENVIRONMENT -**
L STALL WARN	RADIO ALT	GPS 1 ②	L BLEED AIR
WHEEL MASTER	ATC 1	L AVIONICS MASTER	OXYGEN VALVE
SQUAT SW	FMS DTU	FMS 1 ①	**- AVIONICS -**
- ENGINE INSTR -	**- CABIN-**	CDU-AAP 1 ①	FMS 1 ② ③
L ITT	CABIN LTS	ERP-AAP 1 ② ③	
L N2			

① Applicable to aircraft equipped with a Collins (single or dual) flight management system.
② Applicable to aircraft equipped with a dual UNS-1B flight management system.
③ Applicable to aircraft equipped with a dual UNS-1C/UNS-1E flight management system.
④ Applicable to aircraft 60-001 thru 60-128 not modified by SB 60-76-2.
⑤ Applicable to aircraft 60-129 and subsequent and prior aircraft modified by SB 60-76-2.
⑥ Applicable to aircraft 60-001 thru 60-173.
⑦ Applicable to aircraft 60-174 and subsequent.

DC Bus Failure (Cont)

DC buses and their associated loads (copilot's circuit breaker panel):

L DC BUS 1		L DC BUS 2	L DC BUS 3
- ELECTRICAL -	**- ENGINE INSTR-**	**- R ENGINE -**	**- AFCS -**
EMER BAT 2	R ITT	R ENG CH A ④	FD 2 ② ③
- AFCS -	R N2	R ENG CH B ⑤	AP 2
FD 2 ①	**- ANTI-ICE -**	R OVSP	**- FUEL -**
SYSTEM TEST	R STALL VANE HEAT	R TR CONT	R STBY-SCAV PUMP
- FUEL -	R WSHLD DEFOG	R IGN CH B	**- R ENGINE -**
FUEL QTY PWR 2	WSHLD HEAT	**- LIGHTS -**	R IGN CH A
FUS TANK AUX PUMP	ALCOHOL SYSTEM	R INSTR LTS	R START
R JET PUMP-XFR VALVE	R NAC HEAT	**- HYDRAULICS -**	ENGINE DIAGNOSTIC SYSTEM
- R ENGINE -	STAB HEAT	HYDRAULIC PRESS IND	R TR AUTO STOW
R FIRE DETECT	WING HEAT	AIR PRESS IND	R ENGINE VIB MON
R FIRE EXT	**- ENVIRONMENT -**	**- ENGINE INSTR-**	**- LIGHTS -**
R FW SOV	CABIN AIR	R N1	R EL LTS
R ENG CH B ④	AUX CABIN-CREW HEAT	R FUEL FLOW	**- HYDRAULICS -**
R ENG CH A ⑤	CABIN PRESS SYS	**- ENVIRONMENT -**	ANTI SKID
- LIGHTS -	**- INSTRUMENTS -**	CABIN TEMP IND	**- ENGINE INSTR-**
WING INSP LT	AHS 2	CREW FAN ⑥	R OIL TEMP-PRESS
WARN LTS	MFD 2	AUTO TEMP CONT	**- ANTI-ICE -**
BEACON-STROBE LTS	SDU PWR 2	**- INSTRUMENTS -**	R ICE DETECT LIGHT
- TRIM-FLT CONT -	EFIS CTL 2	ADC-ARP 2	**- ENVIRONMENT -**
SEC PITCH TRIM	**- AVIONICS -**	STATIC SOURCE	R BLEED AIR
FLAPS	DAU 2	PFD 2	CABIN FAN
TRIM-FLAP-SPOILER INDICATOR	CVR	LO SPD WARN 2	**- AVIONICS -**
R STALL WARN	AUDIO 2	R CLOCK	AVIONIC FANS
SPOILER	DME 2	**- AVIONICS -**	RADAR
NOSE STEER	OSS-GPS 2 ①	IAPS TEMP 2	OSS 2 ②
RUDDER PEDAL ADJUST	FMS 2 ② ③	COMM 2	GPS 2 ②
- HYDRAULICS -	**- CABIN -**	RTU 2	FMS 2 ①
GEAR	CABIN FIRE DETECT	NAV 2	CDU-AAP 2 ①
	CABIN DISPLAY	R AVIONICS MASTER	ERP-AAP 2 ② ③
	PASS SPKR	ATC 2	**- CABIN -**
			CABIN AUDIO
			PASS INFO

① Applicable to aircraft equipped with a Collins (single or dual) flight management system.
② Applicable to aircraft equipped with a dual UNS-1B flight management system.
③ Applicable to aircraft equipped with a dual UNS-1C/UNS1-E flight management system.
④ Applicable to aircraft 60-001 thru 60-128 not modified by SB 60-76-2.
⑤ Applicable to aircraft 60-129 and subsequent and prior aircraft modified by SB 60-76-2.
⑥ Applicable to aircraft 60-001 thru 60-173.

ELEC PWR Light Illuminated

Illumination of the ELEC PWR light indicates that one or more electrical system parameter is at or approaching its limit. Illumination of the ELEC PWR light will be accompanied by an amber or red light on the electrical power monitor and flashing of the affected display. This indicates one or more of the following:

- AC voltage is above or below limits
- DC voltage is above or below limits
- Generator load is high and may be in excess of generator limits

NOTE

- Selecting the CABIN PWR Switch (if installed) — OFF is one means of reducing generator loads. Further load reduction may be necessary.
- During single-generator operations in flight, the freon cooling system, crew aux heater, and loads on the cabin power bus are automatically deactivated.

1. Electric Power Monitor — Check.
2. ●**If a VAC display is flashing:**
   a. Refer to **AC Bus Failure** procedure, this section.
   b. This checklist is complete.
2. ●**If the VDC display is flashing and voltage is low:**
   a. Reduce electrical load.
   b. This checklist is complete.
2. ●**If the VDC display is flashing and voltage is high:**
   a. L START-GEN Switch — OFF.
   b. ■**If voltage is still high:**
      (1) L START-GEN Switch — L GEN.
      (2) R START-GEN Switch — OFF.
      (3) ▲**If voltage is still high,** both START-GEN Switches — OFF. Go to **Dual Generator Failure** procedure, Section III.
      (3) ▲**If voltage returns to normal,** this checklist is complete.
   b. ■**If voltage returns to normal:**
      (1) Leave L START-GEN Switch — OFF.
      (2) This checklist is complete.
2. ●**If an AMP display is flashing:**
   a. Electrical Load — Reduce, if required to observe generator limits.
   b. This checklist is complete.

Single Generator Failure

A generator failure is indicated by an amber L GEN or R GEN light on the annunciator panel. It will be accompanied by an indication of zero AMPS on the EIS electrical page.

NOTE

During single-generator operations in flight, the cooling system (air conditioner), crew aux heater, and loads on the cabin power bus are automatically deactivated.

1. START-GEN Switch — GEN.
2. Affected START (ENGINE group) and GEN (ELECTRICAL group) Circuit Breakers — Set.
3. Electrical Load — Reduce, if required to observe generator limits. During single-generator operations in flight, the cooling system, and loads on the cabin power bus are automatically deactivated.
4. COOL Switch — OFF (ensures cooling system is deactivated).
5. GEN RESET Switch — RESET momentarily.

CAUTION

Depressing and holding the GEN RESET switch longer than one second, or multiple activations, may cause damage to the electrical system.

6. ● **If generator does *not* reset:**
   a. N_2 — 80% or greater.
   b. START-GEN Switch — OFF, then GEN.
   c. GEN RESET Switch — RESET momentarily.

CAUTION

Depressing and holding the GEN RESET switch longer than one second, or multiple activations, may cause damage to the electrical system.

   d. ■ **If generator still does *not* reset:**
      (1) START-GEN Switch — OFF.
      (2) This checklist is complete.
   d. ■ **If generator resets,** this checklist is complete.
6. ● **If generator resets,** this checklist is complete.

Airstart

WARNING

Do not attempt an airstart following an engine failure which was accompanied by indications of internal engine damage or fire.

CAUTION

- **Do not** attempt an airstart without an indication of N1 rotation.
- If ITT is approaching the limit and rising rapidly, immediately place Thrust Lever in CUTOFF position and abort start.

Affected Engine:

1. Assure that aircraft is within appropriate Airstart Envelope as shown in Figure 4-1, this section, if conditions permit.
2. ENG CMPTR Switch — AUTO.
3. Thrust Lever — CUTOFF. Wait 10 seconds to allow fuel to drain from engine.

NOTE

On aircraft 60-129 and subsequent and prior aircraft modified by SB 60-76-2, with thrust lever in CUTOFF and EMER BUS selected, the ITT indicator may be inoperative. When the thrust lever is moved out of CUTOFF, the ITT indicator will be operative.

4. Fuel Supply — Check.
   a. Fuel available from wing tank.
   b. ENG FIRE PULL T-Handle —Check in.
5. Fuel Panel Switches — As follows:
   a. JET PUMP — Off.
   b. STBY PUMP Switch — ON.
   c. XFLO VALVE — Closed.
   d. GRVTY XFR — Off.
   e. NORM XFR — Off.
   f. AUX XFR — Off.
6. Electrical Load — Reduce.
7. NAC HEAT Switch — OFF.
8. BLEED AIR Switch — OFF.
9. ● **If Starter-Assisted Airstart:**
   a. START-GEN Switch — START. Amber Starter Engaged Light will illuminate.
   b. Thrust Lever — IDLE at minimum 5% N2.
   c. Go to step 10.

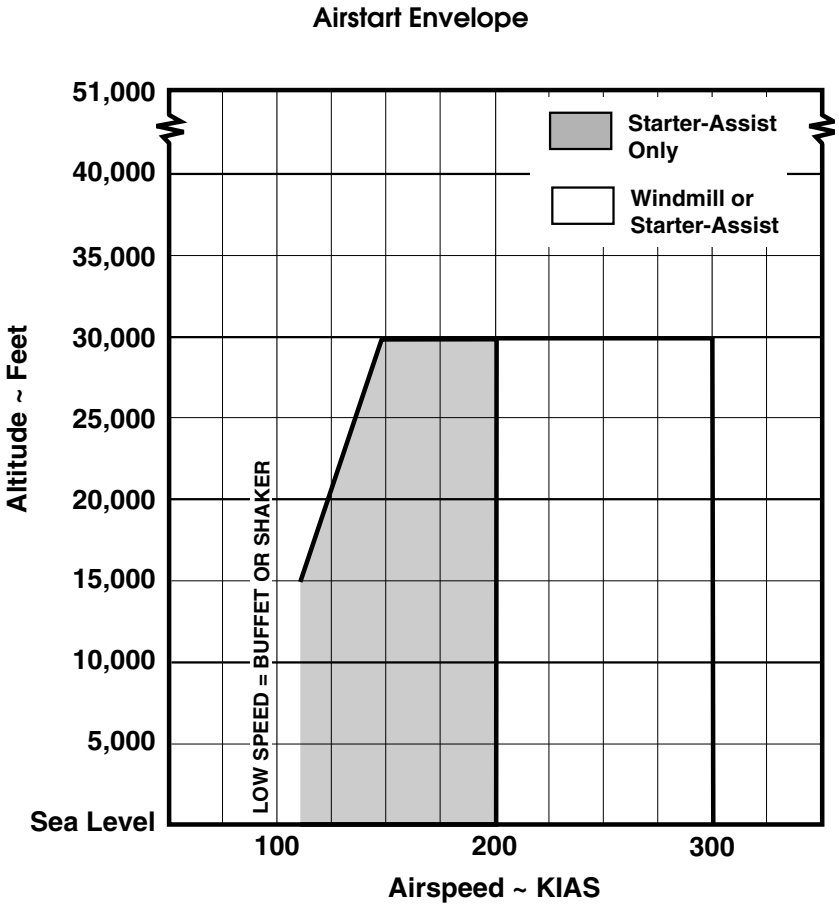
Airstart (Cont)

9. ●**If Windmilling Airstart:**
   a. START-GEN Switch — OFF or GEN.
   b. Thrust Lever — IDLE at minimum 7% N_2.
   c. Go to step 10.
10. IGNITION Light and FUEL FLOW — Check.
11. ITT — Check rise.
12. ●**If no indication of light-off is obtained within 60 seconds of achieving 7% N_2:**
   a. Thrust Lever — CUTOFF.
   b. START-GEN Switch — OFF.
   c. Repeat AIRSTART Procedure.

CAUTION

No more than three consecutive starter-assist airstarts should be attempted to prevent severe battery drain and generator burnout.

   d. ■**If engine will not restart,** go to **Engine Shutdown in Flight** procedure, this section.
   d. ■**If engine starts,** go to step 13.
12. ●**If engine starts,** go to step 13**.**
13. Engine Instruments — Normal indications.
14. IGNITION and Starter Engaged Lights — Out.
15. START-GEN Switch — GEN.
16. BLEED AIR Switch — ON.
17. NAC HEAT Switch — On as required.
18. JET PUMP and STBY PUMP Switches — As required.
19. FMS — Initialize position and fuel remaining, as necessary.



- ITT may be minimized during engine start if ITT prior to start is 100°C or less.

- Use starter assisted airstart when N_2 is less than 7%.

Figure 4-1

Alternate Engine Start (Ground Only)

This alternate starting procedure may be used if an engine fails to start (on the ground) using the normal starting procedure in Section II and any of the following abnormal conditions are observed:

- No fuel flow
- No ignition
- Engine fails to accelerate

Affected Engine:

1. Accomplish steps 1 thru 9 of the normal **Starting Engines** procedure in Section II.
2. Thrust Lever — IDLE.
3. JET PUMP Switch — OFF.
4. STBY PUMP Switch — ON.
5. STAB WING HEAT Switch — On.
6. CAB AIR Switch — ON.
7. ENG CMPTR Switch — CH. A
8. IGNITION Switch — On.
9. START-GEN Switch — START.

CAUTION

If ITT is approaching the limit and rising rapidly, immediately place thrust lever in CUTOFF position and abort start.

10. ● **If no indication of light-off is obtained within 10 seconds of achieving 5.2% N_2:**
    a. Thrust Lever — CUTOFF.
    b. START-GEN Switch — OFF.
    c. IGNITION Switch — OFF.
    d. STBY PUMP Switch — Off.
    e. After an appropriate cooling period, repeat steps 2 thru 9 using CH. B position of the ENG CMPTR switch.

10. ● **If engine starts,** go to step 11.
11. At 40% N_2, IGNITION Switch — OFF.
12. Engine Instruments — Normal indications.
13. START-GEN Switch — GEN.
14. ENG CMPTR Switch — Select opposite channel (CH. A or CH. B as appropriate), then AUTO.
15. STAB WING HEAT Switch — OFF.
16. CAB AIR Switch — OFF.
17. JET PUMP Switch — On.
18. STBY PUMP Switch — Off.
19. Continue with step 13 of the normal **Starting Engines** procedure in Section II.

EDS FAULT Light Illuminated

On aircraft 60-001 thru 60-030 not incorporating SB 60-77-1, the Engine Diagnostic System is not yet fully operational; therefore, the EDS FAULT light will not illuminate except during the warning lights test.

***O*n aircraft 60-031 and subsequent, and prior aircraft incorporating SB 60-77-1,** illumination of the white EDS FAULT light indicates one of the following about the Engine Diagnostic System (EDS):

- The EDS has lost power.
- The EDS built in test equipment (BITE) has detected a system failure.
- The EDS memory is 85% full.
- The system has detected an engine condition which is out of acceptable parameters.

1. ● **If *not* preceded by an engine exceedance,** notify maintenance personnel of the EDS light illumination and download the EDS data at the next suitable maintenance opportunity.
1. ● **If preceded by an engine exceedance,** refer problem to maintenance personnel for correction at the earliest possible maintenance.

ENG CHIP Light Illuminated

Illumination of either the amber L or R ENG CHIP light indicates the presence of metallic particles in the engine oil.

1. Engine Instruments — Monitor for indication of malfunction.
2. Investigate cause at earliest possible maintenance.

Amber ENG CMPTR Light Illuminated

Illumination of an amber ENG CMPTR light indicates a major malfunction in one channel of the associated engine's Full Authority Digital Engine Control (FADEC) system. With the ENG CMPTR switch in the AUTO position, the FADEC will automatically select the most capable channel (A or B) to control the engine. Engine operation is not affected.

NOTE

The ENG CMPTR RESET switch (if applicable) is not operational on the ground.

On the ground:

Takeoff is **not** permitted with an amber ENG CMPTR light illuminated.

1. Complete the **After Landing/Clearing Runway** and **Shutdown** procedures in Section II.
2. Allow aircraft to remain de-powered for 2 minutes minimum.
3. Complete the **Before Starting Engines** and **Starting Engines** procedures in Section II.
4. ● **If amber ENG CMPTR light remains illuminated,** DO NOT TAKEOFF. Refer problem to maintenance personnel for correction.

4. ● **If amber ENG CMPTR light extinguishes,** continue normal procedures in Section II.

In flight:

1. Engine Instruments — Monitor for indication of malfunction.
2. ● *Aircraft 60-001 thru 60-065 with ENG CMPTR RESET switch,* **do not** use the ENG CMPTR RESET Switch.

NOTE

Use of the ENG CMPTR RESET Switch may result in a momentary rollback on the affected engine. Use of the ENG CMPTR RESET Switch with the engines operating at high power may also result in engine compressor stalls during engine rollback.

2. ● *Aircraft 60-066 thru 60-128 with ENG CMPTR RESET switch,* when conditions permit, ENG CMPTR RESET Switch — Hold left or right (as applicable) for approximately 2 seconds. If the malfunction has cleared, the ENG CMPTR light(s) will extinguish.
2. ● *Aircraft 60-129 and subsequent, and prior aircraft* ***without*** *ENG CMPTR RESET switch,* go to step 3.
3. Refer problem to maintenance personnel for correction prior to next flight.

Amber and White ENG CMPTR Light Illuminated

Illumination of both the amber and white ENG CMPTR lights may indicate a major malfunction in both channels of the associated engine's Full Authority Digital Engine Control (FADEC) system. With the ENG CMPTR switch in the AUTO position, the FADEC will automatically select the most capable channel (A or B) to control the engine. Engine operation may be affected.

NOTE

The ENG CMPTR RESET switch (if applicable) is not operational on the ground.

On the ground:

Takeoff is **not** permitted with both the amber and white ENG CMPTR lights illuminated.

1. Refer problem to maintance personnel for correction prior to takeoff.

In flight:

1. Engine Instruments — Monitor for indication of malfunction.
2. Operate associated thrust lever cautiously.
3. ●**On aircraft 60-001 thru 60-065 with ENG CMPTR RESET switch, do not** use the ENG CMPTR RESET Switch.

NOTE

Use of the ENG CMPTR RESET Switch may result in a momentary rollback on the affected engine. Use of the ENG CMPTR RESET Switch with the engines operating at high power may also result in engine compressor stalls during engine rollback.

3. ●**On aircraft 60-066 thru 60-128 with ENG CMPTR RESET switch,** when conditions permit, ENG CMPTR RESET Switch — Hold left or right (as applicable) for approximately 2 seconds. If the malfunction has cleared, the ENG CMPTR light(s) will extinguish.
3. ●**On aircraft 60-129 and subsequent, and prior aircraft without ENG CMPTR RESET switch,** go to step 4.
4. ■**If engine operation is satisfactory,** continue operation with ENG CMPTR switch in AUTO position. This checklist is complete.
4. ■**If engine operation is not satisfactory,** go to step 5.

Amber and White ENG CMPTR Light Illuminated (Cont)

5. ENG CMPTR Switch (affected engine) — CH. A or CH. B. Ensure ENG CMPTR switch remains in selected channel for a minimum of 2 seconds.

CAUTION

Use of the ENG CMPTR switch to manually select a channel may cause degraded engine operation or flameout.

6. ●**If engine operation improves,** continue operation with ENG CMPTR switch in selected position. This checklist is complete.
6. ●**If engine operation remains the same or degrades,** ENG CMPTR Switch — Select opposite channel.
   a. ■**If engine operation improves,** continue operation with ENG CMPTR switch in selected position. This checklist is complete.
   a. ■**If engine operation remains the same or degrades,** ENG CMPTR Switch — Select AUTO.
   b. *If engine shutdown is required:*
      (1) Applicable Thrust Lever — CUTOFF.
      (2) *If engine does not shut down,* applicable ENG FIRE PULL Handle — Pull.

White ENG CMPTR Light Illuminated

Illumination of a white ENG CMPTR light indicates a minor malfunction in one or both channels of the associated engine's Full Authority Digital Engine Control (FADEC) system. With the ENG CMPTR switch in the AUTO position, the FADEC will automatically select the most capable channel (A or B) to control the engine. Engine operation is not affected.

NOTE

The ENG CMPTR RESET switch (if applicable) is not operational on the ground.

On the ground:

Takeoff is **not** permitted with a white ENG CMPTR light illuminated.

1. Complete the **After Landing/Clearing Runway** and **Shutdown** procedures in Section II.
2. Allow aircraft to remain de-powered for 2 minutes minimum.
3. Complete the **Before Starting Engines** and **Starting Engines** procedures in Section II.
4. ● **If white ENG CMPTR light does not go out,** DO NOT TAKEOFF. Refer problem to maintenance personnel for correction.

4. ● **If white ENG CMPTR light goes out,** continue normal procedures in Section II.

In flight:

1. Engine Instruments — Monitor for indication of malfunction.
2. ● *Aircraft 60-001 thru 60-065 with ENG CMPTR RESET switch,* **do not** use the ENG CMPTR RESET Switch.

NOTE

Use of the ENG CMPTR RESET Switch may result in a momentary rollback on the affected engine. Use of the ENG CMPTR RESET Switch with the engines operating at high power may also result in engine compressor stalls during engine rollback.

2. ● *Aircraft 60-066 thru 60-128 with ENG CMPTR RESET switch,* when conditions permit, ENG CMPTR RESET Switch — Hold left or right (as applicable) for approximately 2 seconds. If the malfunction has cleared, the ENG CMPTR light(s) will extinguish.

2. ● *Aircraft 60-129 and subsequent, and prior aircraft* ***without*** *ENG CMPTR RESET switch,* proceed to next step.

3. Refer problem to maintenance personnel for correction when possible.

ENG FILTERS Light Illuminated

Illumination of either white L or R ENG FILTERS light indicates an impending bypass of one or more of the following filters:

- Associated airframe-mounted fuel filter
- Associated engine fuel filter
- Associated engine oil filter

1. Investigate cause prior to next flight.

ENG VIB Light Illuminated

Illumination of either the L or R ENG VIB amber light indicates an abnormally high level of vibration in the associated engine.

1. Engine Instruments — Monitor for indication of malfunction.
2. Investigate cause at earliest possible maintenance.

Engine Overspeed

Affected engine:

1. Thrust Lever — Retard.
2. If engine does not respond to thrust lever movement, shut down engine. Refer to **Engine Shutdown in Flight** procedure, this section.

Engine Shutdown in Flight

Affected engine:

1. ENG SYNC Switch — OFF.
2. Thrust Lever — CUTOFF.

NOTE

Engine compressor stalls and unusual engine sounds may occur during engine shutdown. This is normal and will not cause any damage to the engine.

CAUTION

The engine fuel and hydraulic pumps will continue to operate with a windmilling engine. Prolonged operation without fluid available to the pumps may cause damage. Therefore, the ENG FIRE PULL Handle should not be pulled unless a fuel or hydraulic leak is suspected.

3. Rudder Trim — As required.
4. Yaw Damper — As desired.
5. IGNITION Switch — OFF.
6. START-GEN Switch — OFF.
7. Electrical Load — Reduce, if required to observe generator limits.

NOTE

During single-generator operations in flight, the cooling system (air conditioner), crew aux heater, and loads on the cabin power bus are automatically deactivated.

8. BLEED AIR Switch — OFF.
9. XFLO VALVE Switch — Select Open. Monitor fuel balance. Crossflow as required.

NOTE

During single-engine operation, maintain slip/skid indicator centered.

10. Refer to **Airstart**, **Single-Engine Landing**, or **Thrust Reverser Deployed Landing** procedures, this section, as appropriate.

Starter Engaged Light Remains Illuminated after Start

Ground Start

1. Affected START-GEN Switch — GEN. If Starter Engaged light does not go out, the start contactor is still engaged.
2. Both Thrust Levers — CUTOFF.
3. APU (if installed and running) — Shut down:
   a. STOP Switch — Depress.
   b. MASTER Switch — Depress.
4. Both BATTERY Switches — OFF.
5. All EMER BAT Switches — OFF.
6. Do not dispatch until trouble has been corrected.

Starter-Assist Airstart

1. Complete airstart procedure.
2. Affected START-GEN Switch — GEN. If Starter Engaged light does not go out, the start contactor is still engaged.
3. Continue flight.

NOTE

A speed sensor, in the starter/generator, automatically switches the starter/generator to the generator mode at 45% N_2. The generator will operate normally for the remainder of the flight (may be necessary to reset the generator). At shutdown, set BATTERY Switches to OFF to disengage the starter.

4. Correct trouble before next flight.

DUCT OV HT Light Illuminated

Illumination of the amber DUCT OV HT light indicates the temperature of the cabin or crew bleed air distribution duct has exceeded the system limit. The applicable temperature control valve should automatically close.

1. TEMP CONT Indicator — Verify affected valve is in full cold position.
2. ●**If DUCT OV HT light does not go out:**
   a. Affected system's AUTO-MAN or AUTO-CABIN-MAN Switch — MAN.
   b. Affected COLD-HOT Knob — Rotate to full cold.
   c. This checklist is complete.
2. ●**If DUCT OV HT light goes out,** this checklist is complete.

EMER PRESS Light Illuminated

Illumination of the EMER PRESS light without activation of emergency airflow indicates an electrical fault which may prevent activation of emergency airflow.

EMER PRESS Light without emergency airflow

1. Maintain 41,000 feet or below.

EMER PRESS Light accompanied by emergency airflow

1. Retard power as low as practical.
2. L BLEED AIR Switch — OFF.
3. ●**If emergency airflow continues:**
   a. L BLEED AIR Switch — ON.
   b. R BLEED AIR Switch — OFF.
   c. ■**If emergency airflow continues,** go to step 4.
   c. ■**If emergency airflow stops,** this checklist is complete.
3. ●**If emergency airflow stops,** this checklist is complete.
4. Both BLEED AIR Switches — ON.
5. L and R BLEED AIR Circuit Breakers (ENVIRONMENT group) — Pull. Emergency pressurization will not be available. Maintain 41,000 feet or below.

Failure to Depressurize on the Ground

1. CAB AIR Switch — OFF.
2. Both BLEED AIR Switches — OFF.

Loss Of Pressurization Indicator

Loss of the pressurization indicator is indicated by both CABIN ALT and CABIN RATE needles in the OFF position and loss of the DIFF PRESS display.

1. CABIN PRESS IND Circuit Breaker (L ENVIRONMENT group) — Pull and reset.

NOTE

Loss of the pressurization indicator will not effect the operation of the automatic or manual pressurization control system. However, the cabin altitude warning horn and automatic passenger oxygen mask drop will not occur, and the PRESS SYS light will not alert the crew of a differential pressure exceedance. If operating in manual mode, the PRESS SYS light will not alert the crew of an increasing cabin altitude. Automatic activation of the emergency pressurization will occur.

2. ● **If indicator is not regained:**
   a. Aircraft Altitude — 41,000 feet or below.
   b. *If emergency pressurization activates:*
      (1) Execute emergency descent. Refer to **Cabin Altitude Warning Horn Activates, Cabin Altitude Exceeds 10,000 Feet, or CABIN ALT HI Light Illuminates (If Applicable) (Emergency Descent)** procedure, in Section III.
      (2) PASSENGER OXYGEN Valve — DEPLOY (passenger oxygen masks will deploy).
2. ● **If indicator is regained,** this checklist is complete.

Overpressurization (Differential Pressure Exceeds 9.8 psid)

1. MODE Select Switch — Depress to select manual mode. MANUAL will illuminate.
2. MAN ALT Control — UP as required to maintain satisfactory pressurization.
3. MAN RATE Control — Rotate to the desired setting.
4. ● **If unable to regulate the overpressurization:**
   a. One BLEED AIR Switch — OFF.
   b. Adjust power on opposite engine to control cabin pressurization.
   c. This checklist is complete.
4. ● **If pressurization is satisfactory,** this checklist is complete.

PRESS SYS Light Illuminated

Illumination of the PRESS SYS light indicates one or more of the following:

- Differential pressure has exceeded the limit.
- Cabin altitude is abnormally high. The cabin altitude at which this occurs varies depending upon the aircraft's situation (refer to **Pressurization System**, Section II).
- The pressurization system detects a fault.

1. Crew Oxygen Masks — Don.
2. Pilot & Copilot NORM MIC/OXY MIC Switches — OXY MIC.
3. Check the pressurization panel and indicators for cabin altitude, differential pressure, and fault annunciations.
4. ● **If differential pressure exceeds the limit** (DIFF PRESS readout will flash), go to **Overpressurization** procedure, this section.

NOTE

Cabin differential pressures equal to or greater than 10.0 psid cannot be fully displayed on the DIFF PRESS indicator (the first digit will not display). Indications in this category are differentiated by flashing of the digits (e.g., a display of "0.0" indicates 0.0 psid if steady and 10.0 psid if flashing).

4. ● **If cabin altitude is abnormally high,** go to **Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet** procedure, this section.
4. ● **If FAULT light is illuminated:**
   a. MODE Select Switch — Depress to select MANUAL mode.
   b. Use manual mode to control cabin pressurization. Refer to **Pressurization System**, Section II.

Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet

Whenever the pressurization FAULT light illuminates, the pressurization automatic mode will deactivate and stop cabin altitude from rising higher if failure is in automatic control system. Normally, a pressurization loss causes the following events to occur in steps with increasing cabin altitude triggering each subsequent event:

- PRESS SYS (glareshield) and FAULT (switch panel) lights
- Emergency pressurization
- Cabin altitude horn
- Passenger oxygen mask deployment

In some situations all of these events could occur simultaneously (refer to **Pressurization System**, Section II).

1. Crew Oxygen Masks — Don. Select 100% oxygen.
2. If aircraft is climbing, stop climbing and level off at (or descend to) the nearest appropriate altitude.
3. Pilot & Copilot NORM MIC/OXY MIC Switches — OXY MIC.
4. CAB AIR Switch — ON.
5. L and R BLEED AIR Switches — ON.
6. ●**If cabin altitude continues to climb:**
   a. MODE Select Switch — Depress to select MANUAL mode.
   b. MAN ALT Control — As required to maintain satisfactory pressurization.
   c. MAN RATE Control — Rotate to the desired setting.
   d. ■**If cabin altitude continues to climb,** L and R BLEED AIR Switches — EMER. This checklist is complete.

NOTE

- Windshield and wing bleed air anti-ice are not available with both left and right bleed air systems in the emergency pressurization mode. Engine inlet, fan spinner, and windshield alcohol anti-ice will be available.
- If cabin temperature becomes hot from the use of EMER bleed air, one BLEED AIR Switch — OFF. Ensure cabin pressure is maintained. If temperature is still too high, reduce power on engine supplying bleed air.

   d. ■**If cabin altitude stabilizes at a safe altitude:**
      (1) Continue flight in manual pressurization mode. Continued use of the oxygen system is at the crew's discretion.
      (2) This checklist is complete.
6. ●**If cabin altitude stabilizes at a safe altitude,** this checklist is complete.

Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet (Cont)

Return to Automatic Mode Operation



If cabin altitude exceeds 8600 (±200) feet, the automatic pressurization mode is deactivated and the amber PRESS SYS and pressurization FAULT lights will illuminate. Automatic mode operation will not be available until the cabin altitude is decreased and the pressurization system is cycled to unlatch the fault.

1. MAN ALT Control — Center or DN as required to maintain cabin altitude below 8000 feet.
2. MODE Select Switch — Depress to select automatic mode.
3. ●**If the FAULT light does not go out:**
   a. CABIN PRESS SYS Circuit Breaker (R ENVIRONMENT group) — Pull and reset.
   b. ■**If the FAULT light does not go out,** the fault has not cleared and automatic mode operation is not available:
      (1) MODE Select Switch — Depress to select MANUAL mode.
      (2) MAN ALT Control — As required to maintain satisfactory pressurization.
      (3) MAN RATE Control — Rotate to the desired setting.
      (4) This checklist is complete.
   b. ■**If the FAULT light goes out,** the system has successfully returned to the automatic mode. This checklist is complete.

3. ●**If the FAULT light goes out,** the system has successfully returned to the automatic mode. This checklist is complete.

Return to Normal Pressurization Airflow

If normal operation is assured, the following procedure accomplishes resetting emergency pressurization valves and reactivation of normal pressurization airflow.

1. CAB AIR Switch — ON.
2. MAN ALT Control — Center, or DN as required to maintain cabin altitude below 8000 feet.
3. One BLEED AIR Switch — OFF then ON.
4. Other BLEED AIR Switch — OFF then ON.
5. MAN ALT Control — UP, center, or DN as required to maintain cabin altitude appropriate for flight altitude.

Oxygen Duration — Minutes
Fully Charged System

Final Stabilized Cabin Altitude ~ 1000 Feet	2 Crew —	2 Crew 2 Pass	2 Crew 4 Pass	2 Crew 6 Pass	2 Crew 8 Pass	2 Crew 9 Pass	2 Crew 11 Pass
40	313 **313**	96 **96**	57 **57**	40 **40**	31 **31**	28 **28**	23 **23**
35	218 **218**	82 **82**	51 **51**	37 **37**	29 **29**	26 **26**	22 **22**
30	157 **157**	70 **70**	45 **45**	33 **33**	26 **26**	24 **24**	20 **20**
25	157 **114**	69 **59**	44 **40**	33 **30**	26 **24**	23 **22**	20 **19**
20	209 **90**	76 **51**	47 **36**	34 **28**	26 **22**	24 **21**	20 **18**
15	279 **72**	82 **45**	48 **32**	34 **25**	26 **21**	24 **19**	20 **16**
10	279 **57**	**PASSENGER OXYGEN NOT REQUIRED**					
8	228 **52**						
7	208 **50**						

- Bold face numbers (**xxx**) indicate 100% oxygen.
- Light face numbers (xxx) indicate Diluter Demand.
- Crew and passenger oxygen masks are not approved for use above 40,000 feet cabin altitude. **Passenger durations above 30,000 feet cabin altitude are provided for information only. Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended**.
- Prior to overwater flights, plan oxygen requirements to provide sufficient oxygen for all occupants in the event of a pressurization failure. Additional oxygen may be required to assure that both oxygen duration and range (fuel) requirements are satisfied.
- For cabin altitudes of 10,000 feet and above, the oxygen duration times include cabin altitude ascent time from 8000 feet to final stabilized cabin altitude.
- To calculate oxygen duration for a less than fully charged system the following formula may be used:

Duration = Duration from chart x (system pressure ÷ 1850)

Figure 4-2

EFFECTIVITY

Aircraft 60-001 thru 60-103

Pressurization Loss at Altitude or Cabin Altitude Exceeds 8500 Feet (Cont)

Return to Automatic Mode Operation



If cabin altitude exceeds 8600 (±200) feet, the automatic pressurization mode is deactivated and the amber PRESS SYS and pressurization FAULT lights will illuminate. Automatic mode operation will not be available until the cabin altitude is decreased and the pressurization system is cycled to unlatch the fault.

1. MAN ALT Control — Center or DN as required to maintain cabin altitude below 8000 feet.
2. MODE Select Switch — Depress to select automatic mode.
3. ●**If the FAULT light does not go out:**
   a. CABIN PRESS SYS Circuit Breaker (R ENVIRONMENT group) — Pull and reset.
   b. ■**If the FAULT light does not go out,** the fault has not cleared and automatic mode operation is not available:
      (1) MODE Select Switch — Depress to select MANUAL mode.
      (2) MAN ALT Control — As required to maintain satisfactory pressurization.
      (3) MAN RATE Control — Rotate to the desired setting.
      (4) This checklist is complete.
   b. ■**If the FAULT light goes out,** the system has successfully returned to the automatic mode. This checklist is complete.

3. ●**If the FAULT light goes out,** the system has successfully returned to the automatic mode. This checklist is complete.

Return to Normal Pressurization Airflow

If normal operation is assured, the following procedure accomplishes resetting emergency pressurization valves and reactivation of normal pressurization airflow.

1. CAB AIR Switch — ON.
2. MAN ALT Control — Center, or DN as required to maintain cabin altitude below 8000 feet.
3. One BLEED AIR Switch — OFF then ON.
4. Other BLEED AIR Switch — OFF then ON.
5. MAN ALT Control — UP, center, or DN as required to maintain cabin altitude appropriate for flight altitude.

Oxygen Duration — Minutes
Fully Charged System

Final Stabilized Cabin Altitude ~ 1000 Feet	2 Crew —	2 Crew 2 Pass	2 Crew 4 Pass	2 Crew 6 Pass	2 Crew 8 Pass	2 Crew 9 Pass	2 Crew 11 Pass
40	612 **612**	186 **186**	108 **108**	76 **76**	58 **58**	52 **52**	43 **43**
35	426 **426**	159 **159**	97 **97**	69 **69**	53 **53**	48 **48**	40 **40**
30	307 **307**	135 **135**	86 **86**	62 **62**	49 **49**	44 **44**	36 **36**
25	307 **223**	134 **115**	85 **76**	62 **57**	48 **45**	43 **41**	36 **34**
20	408 **176**	147 **99**	89 **69**	63 **52**	49 **42**	44 **38**	36 **32**
15	545 **141**	159 **86**	92 **61**	64 **48**	49 **39**	44 **35**	36 **30**
10	545 **111**	**PASSENGER OXYGEN NOT REQUIRED**					
8	446 **102**						
7	407 **98**						

- Bold face numbers (**xxx**) indicate 100% oxygen.
- Light face numbers (xxx) indicate Diluter Demand.
- Crew and passenger oxygen masks are not approved for use above 40,000 feet cabin altitude. **Passenger durations above 30,000 feet cabin altitude are provided for information only. Passenger masks will not provide sufficient oxygen for prolonged operation above 34,000 feet cabin altitude. Prolonged operation above 25,000 feet cabin altitude with passengers on board is not recommended**.
- Prior to overwater flights, plan oxygen requirements to provide sufficient oxygen for all occupants in the event of a pressurization failure. Additional oxygen may be required to assure that both oxygen duration and range (fuel) requirements are satisfied.
- For cabin altitudes of 10,000 feet and above, the oxygen duration times include cabin altitude ascent time from 8000 feet to final stabilized cabin altitude.
- To calculate oxygen duration for a less than fully charged system the following formula may be used:

Duration = Duration from chart x (system pressure ÷ 1850)

Figure 4-2.1

EFFECTIVITY

Aircraft 60-104 & Subsequent

Autopilot FCP TRIM Light Illuminated in Flight

If the red TRIM light (on Flight Control Panel) illuminates:

Illumination of the red TRIM fail light indicates a failure of the autopilot's pitch trim capability. If the red TRIM light illuminates in flight:

NOTE

When the autopilot is disengaged in a mistrim condition, expect an abrupt change in control force.

1. Autopilot — Disengage.

Autopilot/Yaw Damper Mistrim Annunciator Illuminated in Flight

Illumination of an amber E (Elevator), A (Aileron) or R (Rudder) annunciation on the PFDs indicates that the autopilot or yaw damper is flying the airplane in a mistrimmed condition.

NOTE

When autopilot or yaw damper is disengaged in a mistrim condition, expect an abrupt change in control force.

If the mistrim indication continues for an extended period:

1. Autopilot or Yaw Damper — Disengage.
2. Fuel Balance — Check and correct imbalance if necessary.
3. Retrim aircraft if necessary.
4. Autopilot or Yaw Damper — As desired.

FD Flag Illuminated on EFIS

Display of the flight director flag (red FD on the EFIS display) and removal of the flight director steering commands indicates a failure in the flight director system or loss of sensor data required for the active modes. If the flight director flag appears because of internal failure, loss of AHS data, or selection of AHS reversion, the autopilot will disconnect. If the flight director flag appears because of invalid sensor data, the autopilot will not disconnect; however, a flag on the EFIS display will annunciate the invalid sensor.

If the autopilot remains engaged:

1. Monitor aircraft attitude and position.
2. *If sensor signal is not restored,* change flight director mode, select a different sensor, transfer autopilot, or disconnect autopilot as appropriate.

NOTE

If flight director flag appears because of temporary NAV signal loss, the NAV mode will reacquire and track upon signal restoration.

MACH TRIM Light Only Illuminated

Illumination of only the amber MACH TRIM light indicates the Mach trim system has shut down due to a power loss to the Mach trim computer, a power loss to the primary pitch trim system, or the Mach trim monitor has detected a Mach number/horizontal stabilizer position error. If above 0.77 MI and the autopilot is not engaged, the overspeed warning horn will sound.

1. Airspeed — 0.77 MI or below.
2. Check that primary pitch trim is available:
   a. PITCH TRIM Switch — PRI.
   b. PRI PITCH TRIM Circuit Breaker (L TRIM-FLT CONT group) — Set.
3. ●**If the MACH TRIM Circuit Breaker (L AFCS group) is open:**
   a. MACH TRIM Circuit Breaker — Set.
   b. SYSTEM TEST Switch — Rotate to MACH TRIM.
   c. TEST Button — Depress, then release to resynchronize the system.
   d. ■**If the MACH TRIM circuit breaker opens again:**
      (1) Leave it open.
      (2) This checklist is complete.
   d. ■**If the MACH TRIM circuit breaker holds,** this checklist is complete.
3. ●**If the MACH TRIM circuit breaker is closed,** the Mach trim monitor has deactivated the system. Reset the monitor:
   a. SYSTEM TEST Switch — Rotate to MACH TRIM.
   b. TEST Button — Depress, then release to resynchronize the system.
   c. ■**If the MACH TRIM light does not go out:**
      (1) MACH TRIM Circuit Breaker — Pull.
      (2) This checklist is complete.

NOTE

With the Mach trim system inoperative, flight above 0.77 MI is permitted when the autopilot is engaged.

   c. ■**If the MACH TRIM light goes out,** this checklist is complete.

MACH TRIM and PITCH TRIM Lights Illuminated

Illumination of the amber MACH TRIM and amber PITCH TRIM lights indicates that the Mach monitor has detected a Mach trim computer output fault and has shut down the Mach trim and primary pitch trim systems. If above 0.77 MI and the autopilot is not engaged, the overspeed warning horn will sound.

1. Airspeed — 0.77 MI or below.
2. PITCH TRIM Switch — SEC.
3. MACH TRIM Circuit Breaker (L AFCS group) — Pull.
4. PITCH TRIM Switch — PRI. If the PITCH TRIM light illuminates again, select SEC pitch trim for remainder of flight.

NOTE

With the Mach trim system inoperative, flight above 0.77 MI is permitted when the autopilot is engaged.

PITCH TRIM Light Illuminated in Flight

Illumination of the amber PITCH TRIM light in flight indicates that the trim speed monitor has detected a trim speed fault, the SEC PITCH TRIM circuit breaker is open, the PITCH TRIM selector switch is OFF, or an attempt has been made to trim the aircraft using a control wheel trim switch and the PITCH TRIM selector switch was in the SEC position.

NOTE

If MACH TRIM light is also illuminated, refer to **MACH TRIM and PITCH TRIM Lights Illuminated** procedure in this section.

1. SEC PITCH TRIM Circuit Breaker (R TRIM-FLT CONT group) — Set.
2. ● **If circuit breaker opens,** the autopilot will be inoperative. This checklist is complete.
2. ● **If circuit breaker is closed** (and PITCH TRIM selector switch is in PRI position):
   a. PITCH TRIM Indicator — Check trim position.

NOTE

If PITCH TRIM indicator pointer is on the N DN side of index (►) point, the trim speed monitor has detected a trim speed fault.

   b. PITCH TRIM Selector Switch — SEC.
   c. NOSE DN-OFF-NOSE UP Switch — Operate as required to maintain trim.

SPOILER MON Light Illuminated in Flight

If the spoiler or spoileron system malfunctions, the SPOILER MON light will illuminate and the spoilers will retract. Actuating the SPOILER RESET will restore normal operation if the system malfunction clears.

1. SPOILER Lever — RET.
2. SYSTEM TEST Switch — Rotate to SPOILER RESET, then depress and release.
3. ●**If SPOILER MON light does not go out:**
   a. SPOILERON Circuit Breaker (R TRIM-FLT CONT group) — Pull.

WARNING Do not reset the SPOILERON circuit breaker after it has been pulled. The monitor may be affected.

   b. Spoilers will be inoperative in flight. Limit altitude to 38,000 feet.
   c. Spoilerons will be inoperative in flight.
   d. SYSTEM TEST Switch — Rotate to OFF.
   e. Spoilers may be inoperative during ground operations. Refer to **One or Both Spoilers Up Landing** or **Spoilers Failed Landing** procedure, this section, as appropriate.
   f. This checklist is complete.

3. ●**If SPOILER MON light goes out:**
   a. SYSTEM TEST Switch — Rotate to OFF.
   b. This checklist is complete.

Stall Warning System Failure

Failure of a stall warning system is indicated by steady illumination of the corresponding STALL light and an AOA indicator failure. If both left and right stall warning systems fail, stalls may be avoided by reference to the airspeed indicator. In this event:

1. Maintain airspeed at least 30 knots above stall speeds shown in Section V. VREF may be maintained on final approach in the landing configuration.
2. Limit bank angles to 30° maximum.

NOTE In case of stall warning failure, the corresponding airspeed indicator, on the PFD, will display a amber band and crosshatched red band. In this condition, the top of the amber band will correspond to the maximum shaker speed (heavy weight/flaps up). The top of the red band will correspond to the mini-

mum shaker speed (light weight/flaps down).

Crossflow Valve Fails to Open

1. Maintain wing fuel balance by adjusting power setting.
2. Use **Rapid Transfer Procedure** or **Gravity Transfer Procedure** in Section II to transfer fuselage tank fuel.
3. Monitor individual wing fuel indications to ensure fuel balance.
4. ● **If right wing becomes heavy during fuselage fuel transfer:**
   a. NORM XFR Switch — Select NORM XFR.
   b. AUX XFR Switch — Deselect AUX XFR until wing tanks are balanced.

4. ● **If left wing becomes heavy during fuselage fuel transfer:**
   a. AUX XFR Switch — Select AUX XFR.
   b. NORM XFR Switch — Deselect NORM XFR until wing tanks are balanced.

Fuel Imbalance

IMB, on the fuel quantity indicator, will illuminate when fuel imbalance exceeds operational limits. The fuel quantity reading representing the heavy wing will flash.

CAUTION

Do not crossflow with main jet pump(s) inoperative. Engine starvation may occur due to fuel being pumped through the open crossflow valve into opposite wing.

1. XFLO VALVE Switch — Depress to select open.
2. STBY PUMP Switch (heavy wing) — Depress to select ON.
3. Standby Pump (light wing) — Check Off.
4. XFLO VALVE Switch — Depress to select closed after fuel balance is obtained.
5. STBY PUMP Switches — Select Off.
6. If preceding procedure fails to balance fuel, unequal power setting may be used to balance the wings.

Fuel Quantity Indicator Error Displayed

The fuel quantity indicator monitors the system for faults, and displays corresponding error codes if a fault is detected.

On the Ground

1. Record the error code(s) and the location (L WING, R WING, FUSELAGE or TOTAL).
2. FUEL QTY PWR 1 and 2 Circuit Breakers (FUEL group) — Pull and reset.
3. ●**If fault does *not* clear,** refer problem to maintenance personnel for correction prior to takeoff.

3. ●**If fault clears:**
   a. Continue planned flight.
   b. At earliest possible maintenance, notify maintenance personnel of the recorded error code(s).

In Flight

1. Record the error code(s) and the location (L WING, R WING, FUSELAGE or TOTAL).
2. FUEL QTY PWR 1 and 2 Circuit Breakers (FUEL group) — Pull and reset.
3. ●**If fault does *not* clear,** continue flight using alternate means to ensure adequate fuel and proper fuel distribution.

3. ●**If fault clears,** continue flight.
4. At earliest possible maintenance, notify maintenance personnel of the recorded error code(s).

Fuselage Tank Fuel Transfer Valve Fails to Close

Failure of a fuselage fuel transfer valve does not affect operation of the crossflow valve. If a fuselage fuel transfer valve fails to close at the completion of fuel transfer, the corresponding transfer valve and FUEL SYS lights will remain illuminated. The crossflow valve will close normally and operation of the corresponding standby pump will transfer fuel back into the fuselage tank.

1. Conduct fuel crossflow operations with caution as standby pump operation will transfer some fuel back into the fuselage tank.
2. Periodically transfer fuel back into wings.

NOTE

In the event a jet pump fails, continuous operation of a standby pump may not be possible and a descent to an altitude at which the engine will suction feed may be required. The altitude at which the engine-driven fuel pump will suction feed sufficient fuel to supply the engine will vary depending upon fuel temperature and type.

LOW FUEL Light Illuminated

The amber LOW FUEL light on the glareshield annunciator panel will illuminate when the fuel level in either wing tank is approximately 410 pounds (186 kg) and the aircraft is in level flight.

1. Fuel Quantities — Check. Correct fuel distribution, if required:
   a. Balance wing fuel. Refer to **Fuel Crossflow** procedure in Section II.
   b. Transfer fuselage fuel to the wings. Refer to **Fuselage Tank to Wing Fuel Transfer** procedure in Section II.
2. Replan flight if necessary.

Standby Pump Fails to Shut Off

Operation of the electric standby fuel pumps is indicated by illumination of the corresponding STBY PUMP ON and the FUEL SYS lights. The pumps are turned on manually with the corresponding STBY PUMP switch and automatically during starter-assisted engine starts and during fuselage tank FILL.

If STBY PUMP ON light does *not* go out when pump is selected off:

1. Corresponding STBY PUMP Switch — Cycle.
2. ●**If STBY PUMP ON light does *not* go out:**
   a. Corresponding STBY-SCAV PUMP CB (FUEL group) — Pull.
   b. This checklist is complete.
2. ●**If STBY PUMP ON light goes out**, this checklist is complete.

HYDR PRESS Light(s) Illuminated

On aircraft 60-001 thru 60-025 not incorporating SB 60-78-1: Either engine-driven hydraulic pump will supply sufficient pressure to operate all hydraulic systems. However, the L & R HYDR PRESS lights may illuminate during single hydraulic pump operation.

On aircraft 60-026 & subsequent and prior aircraft incorporating SB 60-78-1: Either engine-driven hydraulic pump will supply sufficient pressure to operate all hydraulic systems. Illumination of either the L or R HYDR PRESS light indicates loss of pressure from the respective pump.

In flight:

1. HYD PRESS Gage — Check.
2. ●**If pressure is low:**
   a. Assume spoilers inoperative. Limit altitude to 38,000 feet.
   b. Go to **Hydraulic System Failure/Alternate Gear Extension** procedure and **Hydraulic System Failure Landing** procedure, this section.
2. ●**If pressure is normal,** continue to monitor.

Hydraulic System Failure/Alternate Gear Extension

Hydraulic system failure is indicated by illumination of both the L & R HYDR PRESS lights and/or by a loss of hydraulic system pressure. Landing gear, flap, spoiler, thrust reversers, and wheel brake systems will be affected. If engine-driven hydraulic pressure is not regained, spoilers and thrust reversers will not be available. If neither engine-driven nor auxiliary hydraulic pressure is regained, emergency brakes will be required after landing.

1. SPOILER Lever — RET.
2. Airspeed — V_{LO} or less (1.3 V_S [flaps 0°] recommended).
3. FLAP Switch — 20°.
4. ENG SYNC Switch — OFF.
5. LANDING GEAR Switch — DN.
6. GEAR Circuit Breaker (R HYDRAULICS group) — Pull.
7. SPOILERON Circuit Breaker (R TRIM-FLT CONT group) — Pull.

Extend landing gear as follows:

NOTE

- It is recommended that blow down extension be selected first. Gear free fall should only be selected if blow down fails to extend and lock gear.
- The two main gear red UNSAFE lights will remain illuminated after blow down or free fall gear extension because the inboard gear doors remain open.

8. EMER BLOW DOWN GEAR Lever (right side of pedestal aft of free fall lever) — Push full down (until lever latches).

CAUTION

Do not attempt to retract landing gear once blow down has been selected. To do so may cause excessive air pressure to be introduced into the hydraulic system return lines, thereby rupturing the reservoir.

Hydraulic System Failure/Alternate Gear Extension (Cont)

9. Check, three green DOWN and two red (main gear) UNSAFE lights illuminated.
10. ●**If all three gear are down and locked,** go to **Hydraulic System Failure Landing** procedure, this section.
10. ●**If any gear is *not* down and locked:**
    a. Airspeed — 180 KIAS recommended.
    b. EMER FREE FALL GEAR Lever (forward of blow down lever) — Push full down (until lever latches).

NOTE

Landing gear position indications may not illuminate until after the EMER FREE FALL GEAR lever is returned to the up position.

    c. After 30 seconds, return the EMER FREE FALL GEAR lever to the up position. This is accomplished by lifting the lever release (small metal tab available through hole immediately forward of extension lever) and then pulling the extension lever to the full up (latched) position.

WARNING

The EMER FREE FALL GEAR lever must be returned to the up position or any remaining hydraulic pressure cannot be regained and emergency braking will not be available in the event of an air leak in the free fall extension system.

    d. Check, three green DOWN and two red (main gear) UNSAFE lights illuminated.

NOTE

Side slips (up to 1 ball) or increasing airspeed (not to exceed VLO) may be required to lock the landing gear down.

    e. ■**If all three gear are down and locked,** go to **Hydraulic System Failure Landing** procedure, this section.
    e. ■**If any gear is *not* down and locked,** go to **Gear Up Landing** procedure, this section.

Attitude Heading System (AHS) Malfunction

A system malfunction is indicated by an ATT and/or a MAG flag and loss of attitude and/or heading data on the flight displays.

NOTE

With the loss of one AHS, the autopilot and yaw damper will disengage and will not re-engage.

1. AHS Switch (EFIS Control Panel) on failed side — Select cross-side AHS.

NOTE

The cross-side AHS will drive the flight displays and equipment normally sourced by the failed AHS. Pitch, roll, and heading comparators will be disabled. The flight director, on the failed side, will not be operative.

2. For single AHS operation, monitor standby attitude indicator.

If time and conditions permit, recover failed AHS:

NOTE

Recovery of a failed AHS may be possible but should only be attempted when flight situation permits operation without one attitude display during straight and level flight for approximately 10-35 seconds.

3. Establish aircraft in straight and level, unaccelerated flight.
4. EMER BAT 2 Switch — OFF.
5. Failed AHS Circuit Breaker (INSTRUMENTS group) — Pull and reset.
6. EMER BAT 2 Switch — On.
7. AHS Switch on failed side — Reselect on-side AHS to monitor AHS initialization. Maintain aircraft attitude by monitoring the operating side flight display and the standby attitude indicator. Initialization should occur within approximately 10-35 seconds. Successful initialization is indicated by attitude and heading displays with no flags.

NOTE

Verify proper attitude and heading information before utilizing displays.

8. If initialization does not occur within approximately 10-35 seconds as indicated by no attitude or heading information, red ATT or HDG flags, or excessive differences in attitude; AHS Selection switch (on side with failed AHS) — Select cross-side AHS.

Comparator Warning

A mismatch of pilot's and copilot's attitude or heading data is indicated by a yellow PIT (pitch), ROL (roll) and/or HDG annunciation on the flight displays.

1. Compare indications with standby attitude indicator and/or magnetic compass to determine faulty system.
2. ●**If mismatch is PIT or ROL:**
   a. Autopilot and Yaw Damper — Disengage.
   b. AHS Switch (EFIS Control Panel) on failed side — Select cross-side AHS.

NOTE

The autopilot and yaw damper will not re-engage. The flight director, on the failed side, will not be operative.

2. ●**If mismatch is HDG:**
   a. Establish aircraft in straight and level, unaccelerated flight.
   b. Compare indications with magnetic compass to determine faulty system.
   c. ■**If single system is in error**, associated HEADING SLAVE-FREE Switch — FREE, then SLAVE.
   c. ■**If heading cannot be determined**, Autopilot and Yaw Damper — Disengage.
   d. Both HEADING SLAVE-FREE Switches — FREE, then SLAVE.
   e. If heading split cannot be corrected, AHS Switch (EFIS Control Panel) on failed side — Select cross-side AHS.

NOTE

The autopilot and yaw damper will not re-engage. The flight director, on the failed side, will not be operative.

Electronic Flight Instrument System Failure (EFIS)

Primary Flight Display (PFD) Failure

1. PFD Switch (EFIS Control Panel) on failed side — Depress to select REV mode. The data which was displayed on the PFD will now be displayed on the adjacent multifunction display.

Multifunction Display (MFD) Failure

1. No crew action is required. All necessary flight data will be displayed on the primary flight display.

Flight Management System (FMS) Failure

FMS failure is evidenced as follows:

Failure caused by an EFIS Radar Panel (ERP) fault will be annunciated on the associated Control Display Unit (CDU). Failure caused by a CDU or Navigation Computer Unit (NCU) fault will either lock up or blank the CDU screen.

1. System Power Check:
   a. FMS Circuit Breaker (AVIONICS group) on failed side — Pull and reset.
   b. ERP-AAP Circuit Breaker (AVIONICS group) on failed side — Pull and reset.
   c. FMS on failed side — Select ON.
2. ● **If FMS operation is restored:**
   a. FMS — Re-initialize.
   b. This checklist is complete.
2. ● **If FMS operation is not restored:**
   a. CDU Switch (EFIS Control Panel) on failed side — Depress to select cross-side CDU and ERP.
   b. Both flight displays will be controlled by the selected CDU and ERP.

NOTE

Course knob and altitude awareness panel (AAP) functions on failed side will be inoperative. The operative course knob and AAP will control both flight displays.

   c. Select appropriate navigation source.
   d. This checklist is complete.
2. ● **If FMS failure causes erroneous RTU operation:**
   a. FMS on failed side — Select OFF.
   b. Tune radios using RTUs and operative CDU.
   c. This checklist is complete.

CDU Data Bus Fail (Red) *(Aircraft with SCN 802.0 to 802.4)*

Generated by the CDU display when it has not been refreshed by the navigation processor. Indicates that the CDU display is functioning properly and that a problem may exist with the navigation capabilities.

1. FMS — OFF (use the ON-OFF DIM key).

NOTE

Do NOT use the circuit breaker to cycle power to the FMS.

2. FMS — Power up.

If CDU DATA BUS FAIL remains: Do not use the FMS.

EFFECTIVITY
Aircraft with UNS-FMS

Loss of Air Data or Erroneous Indications

An air data computer (ADC) failure is indicated by failure flags and loss of air data on the corresponding PFD.

A pitot-static malfunction is indicated by erroneous indications and discrepancies between the pilot's, copilot's and standby airspeed, Mach and/or altimeter indications.

1. Maintain safe aircraft attitude and power setting.

NOTE

Erratic autopilot operation may occur with an air data or pitot-static malfunction.

2. Maintain aircraft control by reference to the standby airspeed/Mach indicator and altimeter.

NOTE

When using the standby indications, refer to **Airspeed/Mach Calibration** and **Altitude Position Correction — Standby System** in Section V.

3. Cross-check angle-of-attack indicators.
4. Refer to one of the following procedure as appropriate:
   - *If the air data loss is limited to a single PFD,* refer to **Single Air Data Computer Failure**
   - *If the air data loss occurs in both PFDs,* refer to **Dual Air Data Computer Failure**
   - *If the air data loss indications are erroneous,* refer to **Pitot-Static System Malfunction**

Single Air Data Computer (ADC) Failure

1. ADC Switch (EFIS Control Panel) on failed side — Select cross-side ADC. Air data references on both PFDs will be controlled by the selected Air data Reference Panel (ARP).

NOTE

If the autopilot is coupled to the side using cross-side ADC, all air data modes will synchronize at engagement and cannot be changed using the ARP.

If time and conditions permit:

2. Applicable ADC-ARP Circuit Breaker (INSTRUMENTS group) — Pull and reset.

NOTE

If ADC-ARP circuit breaker will not reset, all ARP functions (on failed side) will be inoperative.

3. ADC Switch on failed side — Reselect on-side ADC.
4. Cross-check airspeed and altitude indications with the standby instruments.
5. If air data computer is not recovered, ADC Switch on failed side — Select cross-side ADC.

Flight Management System (FMS) Failure

FMS failure is evidenced as follows:

Failure caused by an FMS fault will be annunciated by FMS FAULT in red on the affected Control Display Unit (CDU). Failure caused by a CDU fault will either lock up or blank the CDU screen.

1. System Power Check:
   a. FMS Circuit Breaker (AVIONICS group) on failed side — Pull and reset.
   b. CDU-AAP Circuit Breaker (AVIONICS group) on failed side — Pull and reset.
2. ● **If FMS operation is restored:**
   a. FMS — Re-initialize.
   b. This checklist is complete.
2. ● **If FMS operation is not restored:**
   a. CDU Switch (EFIS Control Panel) on failed side — Depress to select cross-side CDU.
   b. Both flight displays will be controlled by the selected CDU.

NOTE

- Course knob and altitude awareness panel (AAP) functions on failed side will be inoperative. The operative course knob and AAP will control both flight displays.
- If either FMS circuit breaker is open, the data on both VLF 1 and VLF 2 SDU pages will be crossed over. The pilot may use the VLF/OMEGA STATUS page on the operating MFD to determine the condition of the sensor.

   c. Select appropriate navigation source.
   d. This checklist is complete.
2. ● **If FMS failure causes erroneous RTU operation:**
   a. RMT TUNE Switch (EFIS Control Panel) on failed side — Depress to select OFF.
   b. Tune radios using RTUs; CDU tuning will not be available.
   c. This checklist is complete.

EFFECTIVITY
Aircraft with Single/Dual Collins

Loss of Air Data or Erroneous Indications

An air data computer (ADC) failure is indicated by failure flags and loss of air data on the corresponding PFD.

A pitot-static malfunction is indicated by erroneous indications and discrepancies between the pilot's, copilot's and standby airspeed, Mach and/or altimeter indications.

1. Maintain safe aircraft attitude and power setting.

NOTE

Erratic autopilot operation may occur with an air data or pitot-static malfunction.

2. Maintain aircraft control by reference to the standby airspeed/Mach indicator and altimeter.

NOTE

When using the standby indications, refer to **Airspeed/Mach Calibration** and **Altitude Position Correction — Standby System** in Section V.

3. Cross-check angle-of-attack indicators.
4. Refer to one of the following procedure as appropriate:
   - *If the air data loss is limited to a single PFD,* refer to **Single Air Data Computer Failure**
   - *If the air data loss occurs in both PFDs,* refer to **Dual Air Data Computer Failure**
   - *If the air data loss indications are erroneous,* refer to **Pitot-Static System Malfunction**

Single Air Data Computer (ADC) Failure

1. ADC Switch (EFIS Control Panel) on failed side — Select cross-side ADC. Air data references on both PFDs will be controlled by the selected Air data Reference Panel (ARP).

NOTE

If the autopilot is coupled to the side using cross-side ADC, all air data modes will synchronize at engagement and cannot be changed using the ARP.

If time and conditions permit:

2. Applicable ADC-ARP Circuit Breaker (INSTRUMENTS group) — Pull and reset.

NOTE

If ADC-ARP circuit breaker will not reset, all ARP functions (on failed side) will be inoperative.

3. ADC Switch on failed side — Reselect on-side ADC.
4. Cross-check airspeed and altitude indications with the standby instruments.
5. If air data computer is not recovered, ADC Switch on failed side — Select cross-side ADC.

Loss of Air Data or Erroneous Indications (Cont)

Dual Air Data Computer (ADC) Failure

1. ADC-ARP 1 and 2 Circuit Breakers (INSTRUMENTS group) — Pull and reset.
2. ● *If neither ADC is recovered,*
   a. Both AHSs will revert to basic mode
   b. the following systems and instruments will be inoperative:
      - Pilot's and copilot's air data displays.
      - Temperature displays.
      - Altitude alerter.
      - Mach trim.
      - Low-speed awareness cue.
      - Overspeed warning horn and cue.
      - Left and right stall warning systems altitude bias.
      - Landing gear horn altitude and airspeed bias.
      - Certain functions of the FMS system requiring air data.
      - Omega/VLF position accuracy will be degraded.
      - Encoded altitude function of the transponders.
      - Reverse thrust scheduling as a function of airspeed. Maximum reverse thrust available will be 65% N1.
      - Pressurization automatic mode.
   c. Do not engage autopilot.

NOTE

Engagement of the autopilot may result in monitored disconnects because of differences in the AHS attitude. Similar disconnects may occur with yaw damper engagement. The flight director will be operative.

   d. Monitor the standby attitude indicator.
   e. This checklist is complete.
2. ● *If either ADC is recovered,*
   a. Cross-check airspeed and altitude indications with the standby instruments.
   b. This checklist is complete.

Pitot-Static System Malfunction

Static pressure for the pilot's air data computer is supplied by a static port on the left and right pitot-static probes. Static pressure for the copilot's air data computer is supplied by another static port on these pitot-static probes. Either or both of these pitot-static probes can be selected to supply static pressure to the pilot's and copilot's air data computers through the STATIC SOURCE switch. Normally the switch is in the BOTH position.

Loss of Air Data or Erroneous Indications (Cont)

Pitot-static System Malfunction (Cont)

Pitot pressure for the pilot's air data computer is supplied by the left pitot-static probe. Pitot pressure for the copilot's air data computer is supplied by the right pitot-static probe.

Pitot pressure for the standby airspeed/Mach indicator is supplied by the standby pitot-static probe. Static pressure for the standby airspeed/Mach and altimeter indicators is supplied by static ports on the standby pitot-static probe.

If pitot-static source malfunction is known or suspected:

1. Compare pilot's, copilot's, and standby pitot-static data. A pitot pressure malfunction will affect airspeed and Mach indications in one system only. A static pressure malfunction in the primary system can affect airspeed, Mach, altitude, and vertical speed indications on both the pilot's and copilot's PFDs.
2. Pitot Heat:
   a. PITOT HEAT Switches — Check On.
   b. L PITOT HEAT, R PITOT-STALL-TAT HEAT, and STANDBY PITOT HEAT Circuit Breakers (ANTI-ICE group) — Set.
3. Determine malfunctioning system by cross-checking the three pitot-static systems. If the malfunctioning system can be identified, selecting cross-side ADC may restore valid air data.

NOTE

- When using the standby indications, refer to **Airspeed/Mach Calibration** and **Altitude Position Correction — Standby System** in Section V.
- The standby pitot-static mast may be visible from the copilot's seat. Visually check mast for ice or damage.
- The overspeed warning horn will sound if either the pilot's or copilot's airspeed indication is above the overspeed cue (VMO/MMO).

4. *If static pressure malfunction is known or suspected,* STATIC SOURCE Switch — L or R as applicable.

NOTE

Selecting L or R static source does not affect airspeed calibrations or altitude position corrections as presented in Section V.

Radio Tuning Unit (RTU) Failure

1. Associated RTU Circuit Breaker (AVIONICS group) — Pull and reset.
2. If RTU failure remains, associated RTU Switch (EFIS Control Panel) on failed side — OFF.
3. Tune radios using the cross-side RTU's 1/2 function or either CDU.
4. If both RTUs have failed:
   a. RTU Switches (EFIS Control Panel) on both sides — OFF.
   b. Tune radios using the CDUs.

NOTE

- Each CDU is capable of tuning the on-side radios.
- Transponder and TCAS (if installed) will revert to standby mode and will not be usable.

EFFECTIVITY
Aircraft with UNS FMS

ANTI-SKID Light Illuminated – ANTI-SKID OFF Operation

Illumination of any amber ANTI-SKID light indicates an anti-skid problem with the associated wheel. If ANTI-SKID switch is OFF, all four ANTI-SKID lights will illuminate. When anti-skid (for any wheel) is inoperative, care must be used during brake application and stopping distances will be increased. Refer to Section V for increased stopping distances for takeoff and landing.

1. ANTI-SKID Switch — OFF, then On. This should clear the system.
2. ● **If any ANTI-SKID light(s) remain illuminated:**
   a. ANTI-SKID Switch — OFF. Refer to Section V for increased stopping distances for takeoff and landing.
   b. Cautiously apply brakes as required.

CAUTION

With anti-skid inoperative, heavy brake pressures may skid the tires and cause tire blow-out. During flight tests, it was determined that modulating toe-brake pressures will produce improved feel and reduce the probability of tire skid.

   c. Be prepared to use **Emergency Braking** Procedure, Section III, if necessary.
2. ● **If all ANTI-SKID lights go out,** this checklist is complete.

Alternate Gear Extension/Electrical Malfunction

1. Airspeed — VLO or less (180 KIAS recommended).
2. ENG SYNC Switch — OFF.
3. LANDING GEAR Switch — DN.
4. GEAR Circuit Breaker (R HYDRAULICS group) — Pull.

Extend landing gear as follows:

NOTE

- It is recommended that blow down extension be selected first. Gear free fall should only be selected if blow down fails to extend and lock gear.
- The two main gear red UNSAFE lights will remain illuminated after blow down or free fall gear extension because the inboard gear doors remain open.

Radio Tuning Unit (RTU) Failure

1. Associated RTU Circuit Breaker (AVIONICS group) — Pull and reset.
2. If RTU failure remains, associated RTU Switch (EFIS Control Panel) on failed side — OFF.
3. Tune radios using the cross-side RTU's 1/2 function or either CDU.
4. If both RTUs have failed:
   a. RTU Switches (EFIS Control Panel) on both sides — OFF.
   b. Tune radios using the CDUs.

NOTE

- CDU 1 is capable of tuning COMM 1 and NAV 1.
- COMM 2, NAV 2, and ADF will remain operative and on the last frequency tuned.
- Transponder and TCAS (if installed) will revert to standby mode and will not be usable.

EFFECTIVITY

Aircraft with Single/Dual Collins

ANTI-SKID Light Illuminated – ANTI-SKID OFF Operation

Illumination of any amber ANTI-SKID light indicates an anti-skid problem with the associated wheel. If ANTI-SKID switch is OFF, all four ANTI-SKID lights will illuminate. When anti-skid (for any wheel) is inoperative, care must be used during brake application and stopping distances will be increased. Refer to Section V for increased stopping distances for takeoff and landing.

1. ANTI-SKID Switch — OFF, then On. This should clear the system.
2. ● **If any ANTI-SKID light(s) remain illuminated:**
   a. ANTI-SKID Switch — OFF. Refer to Section V for increased stopping distances for takeoff and landing.
   b. Cautiously apply brakes as required.

CAUTION

With anti-skid inoperative, heavy brake pressures may skid the tires and cause tire blow-out. During flight tests, it was determined that modulating toe-brake pressures will produce improved feel and reduce the probability of tire skid.

   c. Be prepared to use **Emergency Braking** Procedure, Section III, if necessary.
2. ● **If all ANTI-SKID lights go out,** this checklist is complete.

Alternate Gear Extension/Electrical Malfunction

1. Airspeed — VLO or less (180 KIAS recommended).
2. ENG SYNC Switch — OFF.
3. LANDING GEAR Switch — DN.
4. GEAR Circuit Breaker (R HYDRAULICS group) — Pull.

Extend landing gear as follows:

NOTE

- It is recommended that blow down extension be selected first. Gear free fall should only be selected if blow down fails to extend and lock gear.
- The two main gear red UNSAFE lights will remain illuminated after blow down or free fall gear extension because the inboard gear doors remain open.

Alternate Gear Extension/Electrical Malfunction (Cont)

5. EMER BLOW DOWN GEAR Lever (right side of pedestal aft of free fall lever) — Push full down (until lever latches).

CAUTION

Do not attempt to retract landing gear once blow down has been selected. To do so may cause excessive air pressure to be introduced into the hydraulic system return lines, thereby rupturing the reservoir.

6. Check, three green DOWN and two red (main gear) UNSAFE lights illuminated.
7. ●**If all three gear are down and locked,** this checklist is complete.
7. ●**If any gear is *not* down and locked:**
   a. EMER FREE FALL GEAR Lever (forward of blow down lever) — Push full down (until lever latches).

NOTE

Landing gear position indications may not illuminate until after the EMER FREE FALL GEAR lever is returned to the up position.

   b. After 30 seconds, return the EMER FREE FALL GEAR lever to the up position. This is accomplished by lifting the lever release (small metal tab available through hole immediately forward of extension lever) and then pulling the extension lever to the full up (latched) position.

WARNING

The EMER FREE FALL GEAR lever must be returned to the up position or hydraulic pressure will not be available.

   c. Check, three green DOWN and two red (main gear) UNSAFE lights illuminated.

NOTE

Side slips (up to 1 ball) or increasing airspeed (not to exceed V_{LO}) may be required to lock the landing gear down.

   d. ■**If any gear is *not* down and locked,** go to **Gear Up Landing** procedure, this section.
   d. ■**If all three gear are down and locked,** this checklist is complete.

Nosewheel Steering Malfunction

In the event the nosewheel steering system malfunctions, internal monitors should disconnect the system and a disconnect tone will sound. A nosewheel steering malfunction may be accompanied by an unwanted swerve in either direction.

NOTE

- If NOSE STEER switch was used to engage nosewheel steering, depressing and then releasing the control wheel master switch (MSW) or depressing the NOSE STEER switch will disengage steering.
- If control wheel master switch (MSW) was used to engage nosewheel steering, releasing MSW will disengage steering.

At Normal Taxi Speeds

1. Nosewheel Steering — Disengage (use MSW).
2. Thrust Levers — IDLE.
3. Brake to a stop.
4. Taxi using differential braking and thrust.

During Takeoff or Landing

1. Nosewheel Steering — Disengage immediately (use MSW).
2. Continue takeoff or landing using rudder and/or brakes for directional control.

Operation with Nosewheel Steering not Armed

Normally the nosewheel steering is operated in the armed mode (ARM light illuminated), but may be operated without being armed by depressing and holding either control wheel master switch (MSW). The system's internal monitor will prevent the system from arming if it detects certain faults. Depending on what faults may be detected by the monitor, full authority or limited authority steering will be available using the control wheel master switch (MSW). If a fault is detected in the rudder force sensors, only limited authority will be available.

Use the following procedure to operate nosewheel steering:

1. Either Control Wheel Master Switch (MSW) — Depress and hold.
2. Taxi slowly to determine the amount of steering authority.
3. ● **If full authority is available,** taxi normally. Go to step 4.
3. ● **If limited authority is available:**
   a. Taxi using rudder pedal movement for control.
   b. Use differential braking as desired.
   c. Avoid sharp turns, if possible.
4. STEER ON Light — Monitor.

NOTE

- In the event of a malfunction, the internal monitors should disconnect the system. When the system disconnects, the STEER ON light will go out; however, the disconnect tone will not sound.
- If only limited authority steering is available, the minimum turn radius will approximately double.

Operation with Nosewheel Steering Inoperative

The aircraft may be operated with the nosewheel steering inoperative. Nosewheel shimmy damping is provided through mechanical means; therefore, no electric power is required to provide shimmy damping.

Taxi

Taxi operations are relatively easy.

1. Taxi using differential braking and thrust.
2. Avoid sharp turns, if possible.

NOTE

When taxiing without the nosewheel steering system engaged, it is possible to cause the nose wheel to turn 180° from the desired straight ahead position as the nose wheel free castors when the electric steering system is not engaged. If takeoff is performed with the nose wheel in this position, the uplock will not engage.

Runway Lineup

1. Visually ensure nose gear uplock is forward.

Takeoff

1. Taxi on runway centerline for a short distance to ensure the nose wheel is straight, before applying takeoff power.

Abnormal And Overweight Landings

Abnormal and overweight landings typically require high brake energies at maximum braking to bring the aircraft to a full stop within the distances prescribed in this section. When the landing brake energy defined in Section V is exceeded, wheel fuse plugs may release. When the maximum takeoff brake energy is approached, the possibility of a wheel well fire and some brake fade due to the energy absorbed by the brakes exists.

An overweight landing may exceed the **landing brake energy** limit. Refer to Section V.

NOTE

If the stop was conducted above the landing maximum brake energy limit, it is recommended that the PARKING BRAKE be released and chocks used. This will increase brake cooling efficiency and reduce the possibility of wheel fuse plug release and brake/tire fire.

An abnormal landing will require no more than the **maximum takeoff brake energy** requirements demonstrated in flight tests if the following weight/altitude parameters are observed:

- If the landing weight is 17,000 pounds (7711 kg) or less, the airport elevation must be less than 5000 feet.
- If the landing weight is between 17,000 and 18,000 pounds (7711 to 8165 kg), the airport elevation must be less than 3000 feet.
- If the landing weight is between 18,000 and 19,000 pounds (8165 to 8618 kg), the airport elevation must be less than 1000 feet and the ambient temperature must be 90°F (32°C) or less.
- If the landing weight is between 19,000 and 19,500 pounds (8618 to 8845 kg), the airport elevation must be less than 1000 feet and the ambient temperature must be 64°F (18°C) or less.

If the available field length is greater than the requirements prescribed, gradual or reduced braking should be utilized to stop the aircraft with lower brake energies and within the available field length.

The landing weights, altitudes, landing distance factors and brake energy limits do not take into account the use of thrust reversers. Use of thrust reversers can significantly reduce the amount of energy absorbed by the brakes.

Stabilizer Heat Failure Landing

If approach and landing must be made with any ice (or suspected ice) on the horizontal stabilizer:

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set, or as required.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — 1.3 Vs (Flaps 20°).
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DOWN indications.
11. NOSE STEER Switch — Check ARM.
12. LDG LT-TAXI Switches — As required.
13. L and R ANTI-SKID Lights — Extinguished.
14. Landing Configuration — Flaps - 20°
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. IGNITION Switches — On.
17. Autopilot — Disengage.
18. Yaw Damper —As desired.

NOTE

Use of thrust reversers is recommended.

Wing Heat Failure Landing

If approach and landing must be made with any ice (or suspected ice) on the wing leading edge:

WARNING

Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — VREF + 15.
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DOWN indications.
11. NOSE STEER Switch — ARM.
12. LDG LT-TAXI Switches — As required.
13. L and R ANTI-SKID Lights — Extinguished.
14. Flaps — DN, check indication.
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. IGNITION Switches — On.
17. Autopilot — Disengage.
18. Yaw Damper — As desired.

NOTE

Use of thrust reversers is recommended.

Wing and Stabilizer Heat Failure Landing

If approach and landing must be made with any ice on the wing leading edge and any ice on the horizontal stabilizer:

WARNING

Even **small** accumulations of ice on the wing leading edge can cause an increase in stall speed and possibly, a degradation in stall characteristics.

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — VREF + 25, Flaps - 20°.
5. Normal Landing Distance — Multiply by 1.4
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DOWN indications.
11. NOSE STEER Switch — ARM.
12. LDG LT-TAXI Switches — As required.
13. L and R ANTI-SKID Lights — Extinguished.
14. Landing Configuration — Flaps - 20°.
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. IGNITION Switches — On.
17. Autopilot — Disengage.
18. Yaw Damper — As desired.

NOTE

Use of thrust reversers is recommended

Normal Electrical System Failure Landing

This procedure would be used for landing with an electrical system failure and operation on emergency battery.

NOTE

- Landing on a wide runway with minimum turbulence and crosswind is recommended.
- Roll control authority will be less than normal. Directional control on the runway will be limited without nose wheel steering.

Operative equipment associated with landing:

- Cabin pressurization. Use Manual Mode to control.
- Standby airspeed, altimeter (vibrator, if applicable), and lighting.
- Standby attitude indicator and lighting.
- N_1 indicators.
- Normal brakes (Anti-Skid Off).
- Emergency brakes.
- Nacelle heat (regardless of switch position).

Inoperative equipment associated with landing:

- All anti-ice except nacelle heat.
- All external and LDG/TAXI lights.
- Pitch, aileron, and rudder trim.
- Flaps.
- Spoilers/spoilerons.
- Gear warning horn.
- Anti-skid.
- Thrust reversers.
- Nose wheel steering.
- Stall warning system.

1. Pressurization — Use MAN ALT Control to control cabin altitude to the landing field elevation.
2. Standby Altimeter — Set.
3. Cabin Check:
   a. Passengers Brief.

NOTE

Passenger address system and NO SMOKING FASTEN SEAT BELT sign are inoperative. It may be necessary to turn towards the cabin and shout instructions, including no smoking and seat belt requirements.

Normal Electrical System Failure Landing (Cont)

b. Swivel Seats — Forward or aft and in outboard position. Headrests in place for occupied aft facing seats.
c. Work Tables and Toilet Doors — Check stowed.
d. Aisle — Clear.
e. Aft Cabin Door — Unobstructed.

4. Circuit Breakers — Set, or as required.
5. Final Approach Speed — 1.3 VS (Flaps 0°).
6. Normal Landing Distance (Anti-Skid On) — Multiply by 3.
7. Crew Approach Briefing — Complete.
8. Landing Gear — Use **Alternate Gear Extension/Electrical Malfunction** procedure, this section. DOWN and UNSAFE lights will be operative.
9. Landing Configuration — Flaps - UP.

After Touchdown:

10. Anti-Skid is inoperative. Apply brakes smoothly to reduce the probability of tire skid.

Single-Engine Landing

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Approach Speeds — 1.3 VS (Flaps 20°) and VAPP, computed and bugs set.
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. COOL Switch — OFF.
8. SPOILER Lever — ARM.
9. LANDING GEAR Switch — DN. Check for three green DOWN indications.
10. NOSE STEER Switch — ARM.
11. LDG LT-TAXI Switches — As required.
12. L & R ANTI SKID Lights — Extinguished.
13. Flaps — 20°, check indication.
14. HYD PRESS Gage — Check (1500 to 1575 psi).
15. IGNITION Switch (Operative Engine) — On.
16. Autopilot — Disengage.
17. Yaw Damper — As desired.

NOTE If one thrust lever is in CUTOFF, neither thrust reverser will operate.

Aileron Jammed Landing

NOTE

- For landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.
- For landing, a wide runway with minimum turbulence and crosswind is recommended.

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — 1.3 Vs (Flaps 20°).
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DN indications.
11. NOSE STEER Switch — ARM.
12. LDG LT-TAXI Switches — As required.
13. L & R ANTI-SKID Lights — Extinguished.
14. Landing Configuration — Flaps - 20°.
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. IGNITION Switches — On.
17. Maintain power to touchdown and do not flare.

Elevator Jammed Landing

NOTE

- When landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.
- Landing on a wide runway with minimum turbulence and crosswind is recommended.

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set.
3. Primary Pitch Trim — As required for pitch control.
4. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
5. Final Approach Speed — 1.3 Vs (Flaps 20°).

NOTE

A shallow approach with flaps at 20° will minimize pitch change.

6. Normal Landing Distance — Multiply by 1.2
7. Crew Approach Briefing — Complete.
8. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
9. SPOILER Lever — ARM.
10. ENG SYNC Switch — OFF.
11. LANDING GEAR Switch — DN. Check for three green DN indications.
12. NOSE STEER Switch — ARM.
13. LDG LT-TAXI Switches — As required.
14. L and R ANTI-SKID Lights — Extinguished.
15. Landing Configuration — Flaps - 20°.
16. HYD PRESS Gage — Check (1500 to 1575 psi).
17. IGNITION Switches — On.
18. Maintain power to touchdown and do not flare.

One or Both Spoilers Up Landing

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set, or as required.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — VREF + 30, (Flaps - UP).
5. Normal Landing Distance — Multiply by 1.4
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. ENG SYNC Switch — OFF.
9. LANDING GEAR Switch — DN. Check for three green DOWN indications.
10. NOSE STEER Switch — Check ARM.
11. LDG LT-TAXI Switches — As required.
12. L and R ANTI-SKID Lights — Extinguished.
13. Landing Configuration — Flaps - UP.
14. HYD PRESS Gage — Check (1500 to 1575 psi).
15. IGNITION Switches — On.
16. Autopilot — Disengage.
17. Yaw Damper — Off, prior to landing.

NOTE

- Use of thrust reversers is recommended.
- With one or both spoilers up, the aircraft will not float when thrust levers are moved to IDLE. Maintain power to touchdown.
- Aerodynamic braking at higher speeds will cause the aircraft to become airborne even with the spoilers extended.

Partial Flaps Landing

1. Complete DESCENT procedure, Section II.
2. Circuit Breakers — Set.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — 1.3 Vs for the flap deflection obtained (0°, 8° or 20°). Refer to **Approach Speeds — Abnormal Landings**, Figure 5-67, Section V. Use the approach speed for the lesser flap deflection for flap settings between those listed.
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DOWN indications.
11. NOSE STEER Switch — Check ARM.
12. LDG LT-TAXI Switches — As required.
13. L & R ANTI-SKID Lights — Extinguished.
14. Landing Configuration — Flaps - As obtained.
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. IGNITION Switches — On.
17. Autopilot — Disengage.
18. Yaw Damper — Off, prior to landing.

NOTE Use of thrust reversers is recommended.

Rudder Jammed Landing

NOTE

- When landing with a control jam, fly a long straight-in approach and establish final aircraft configuration at a safe altitude, well before landing.
- Landing on a wide runway with minimum turbulence and crosswind is recommended.

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — 1.3 Vs (Flaps 20°).
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DN indications.
11. NOSE STEER Switch — Depress to disarm system. ARM light off prior to touchdown.
12. LDG LT-TAXI Switches — As required.
13. L and R ANTI-SKID Lights — Extinguished.
14. Landing Configuration — Flaps - 20°.
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. Maintain power to touchdown and do not flare.
17. After landing, maintain directional control with differential braking.

NOTE

If asymmetric power is used, do not retard power until directional control is established.

Spoilers Failed Landing

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set, or as required.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — VREF.
5. Normal Landing Distance — Multiply by 1.3
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. ENG SYNC Switch — OFF.
9. LANDING GEAR Switch — DN. Check for three green DN indications.
10. NOSE STEER Switch — Check ARM.
11. LDG LT-TAXI Switches — As required.
12. L and R ANTI-SKID Lights — Extinguished.
13. Landing Configuration — Flaps - DN.
14. HYD PRESS Gage — Check (1500 to 1575 psi).
15. IGNITION Switches — On.
16. Autopilot — Disengage.
17. Yaw Damper — As desired.

NOTE Use of thrust reversers is recommended.

Stabilizer Jammed Landing

Elevator Pull Force is Encountered (Nose-Down Trim Position)

WARNING

Heavy control column pull forces will be encountered. Copilot assistance is recommended and may be required during the approach and landing to relieve some of the pull force on the column. Throttle control may require assistance also.

NOTE

- If the stabilizer jams during a high-speed condition, delay reducing airspeed as long as possible to minimize the time out of trim.
- Move C.G. aft if possible. Transfer fuel to the fuselage tank if possible.
- Land as soon as practical to minimize forward C.G. movement.

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set, or as required.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — 1.3 Vs (Flaps 8°).
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. ENG SYNC Switch — OFF.
10. LANDING GEAR Switch — DN. Check for three green DOWN indications.
11. NOSE STEER Switch — ARM.
12. LDG LT-TAXI Switches — As required.
13. L and R ANTI SKID Lights — Extinguished.
14. Landing Configuration — Flaps - 8°.
15. HYD PRESS Gage — Check (1500 to 1575 psi).
16. IGNITION Switches — On.
17. Yaw Damper — As desired.

NOTE

Use of thrust reversers is recommended.

Stabilizer Jammed Landing (Cont)

Elevator Push Force is Encountered (Nose-Up Trim Position)

1. Move C.G. forward if possible. Transfer fuel to the wing tanks if possible. Conduct normal landing.
2. Complete **Descent** procedure, Section II.
3. Complete **Approach** procedure, Section II.
4. Complete **Before Landing** procedure, Section II.

Hydraulic System Failure Landing

1. Complete **Descent** procedure, Section II.
2. Complete **Hydraulic System Failure/Alternate Gear Extension** procedure, this section.
3. Circuit Breakers — Set, or as required
4. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
5. HYD PUMP Switch — On.
6. ●**If auxiliary hydraulic pressure is *not* available,** go to step 7.
6. ●**If auxiliary hydraulic pressure is available:**
   a. FLAP Switch — DN.
   b. HYD PUMP Switch — OFF, when maximum flap angle is obtained.
7. Final Approach Speed — 1.3V_S for the flap deflection obtained (0°, 8° or 20°), or V_{REF} if 40°. Refer to **APPROACH SPEEDS — ABNORMAL LANDINGS**, Figure 5-70, Section V. Use the approach speed for the lesser flap deflection for flap settings between those listed.
8. Normal Landing Distance — Multiply by 3.
9. Crew Approach Briefing — Complete.
10. CABIN CLIMATE Controls (inhibit system compressor cycling):
    a. ●**If cooling system is *not* desired:**
       (1) COOL Switch — OFF.
    a. ●**If cooling system is desired:**
       (1) COOL Switch — COOL.
       (2) Cabin AUTO-MAN Switch — MAN.
       (3) Cabin COLD-HOT Knob — COLD.
11. ENG SYNC Switch — OFF.
12. NOSE STEER Switch — Check ARM.
13. LDG LT-TAXI Switches — As required.
14. L and R ANTI SKID Lights — Extinguished.
15. Landing Configuration — Flaps - As obtained.
16. IGNITION Switches — On.
17. EMER BRAKE Handle — Pull out to the ready position.

Hydraulic System Failure Landing (Cont)

Just prior to landing:

18. Autopilot — Disengage.
19. ● **If flaps are up,** Yaw Damper — Off. Go to step 20.
19. ● **If flaps are in any position except up,** Yaw Damper — As desired.
20. HYD PUMP Switch — On.
21. HYD PRESS Gage — Check.

After touchdown:

NOTE

Use of thrust reversers is **not** recommended with abnormal hydraulic system indications. Use of thrust reversers may deplete hydraulic pressure available to other systems.

22. ● **If hydraulic pressure is being maintained:**
    a. SPOILER Switch — EXT.
    b. Brakes — As required.
    c. This checklist is complete.
22. ● **If hydraulic pressure is *not* being maintained:**
    a. EMER BRAKE Handle — Push down slowly on handle, (approximately 2 inches [5 centimeters] before braking action begins). The anti-skid system is inoperative. Apply the brakes smoothly with small movements to produce improved feel and reduce the probability of tire skid. **Do not** pump the brake handle.
    b. Rudder and/or nose wheel steering — As required for directional control.

Gear Up Landing

If a gear up landing must be made, select a long, wide runway with as little crosswind as possible. If time and conditions permit, plan the descent to ensure minimum fuel remaining on the aircraft. Ensure sufficient fuel for controlled, power-on approach.

CAUTION

If the ALTERNATE GEAR EXTENSION — EMER BLOW DOWN has been selected, **do not** attempt to retract the landing gear. To do so may cause excessive air pressure to be introduced into the hydraulic system return lines, thereby rupturing the reservoir.

1. Complete **Descent** procedure, Section II.
2. Brief passengers as required:
   a. Location and operation of emergency exits.
   b. All Loose Items — Secure.
   c. Shoulder Harness and Seat Belts — Secure.
   d. Emergency landing brace position.
3. Circuit Breakers — Set, or as required.
4. Landing Approach Speed (VREF) and Approach Climb Speed (VAPP) — Computed and set. Refer to Section V.
5. Crew Approach Briefing — Complete.
6. ENG SYNC Switch — OFF.
7. CAB AIR Switch — OFF. The aircraft should be depressurized prior to landing.
8. Flaps — DN.

NOTE

The landing gear warning will sound and will not be mutable with any landing gear not down and the flaps full down. In addition, the TAWS alerts, "TOO LOW - GEAR" and "PULL-UP" will sound.

9. IGNITION Switches — On.
10. EMER BAT Switches — OFF.
11. Autopilot — Disengage.
12. Yaw Damper — As desired.
13. Perform normal power-on approach at VREF and touch down at the lowest airspeed with minimum sink rate. **Do not** decelerate below shaker speed.

Gear Up Landing (Cont)

14. ● **If no gear have extended**:
    a. Touch down slightly nose high.
    b. Go to step 15.

14. ● **If the nose gear fails to extend:**
    a. Relocate passengers aft to obtain aft CG, if possible.
    b. SPOILER Lever — ARM.
    c. HYD PUMP Switch — On.
    d. Hold the nose off the runway as long as elevator control is available. If hydraulic pressure is available, normal braking may be available. Use rudder and/or brakes for directional control. Be prepared to use EMER BRAKE. Refer to **Emergency Braking** procedure, Section III.

CAUTION

Use of thrust reversers is **not** recommended with abnormal hydraulic system indications. Use of thrust reversers may deplete hydraulic pressure available to other systems.

    e. Go to step 15.

14. ● **If a main gear fails to extend**:
    a. Land on the same side of the runway as the extended gear.
    b. HYD PUMP Switch — On.
    c. ANTI-SKID Switch — OFF.

CAUTION

Heavy brake pressures may skid the tires and cause tire blow-out.

    d. NOSE STEER Switch — ARM, to assist in directional control. Nosewheel steering may arm but not operate.
    e. Hold the applicable wing up as long as possible. Maintain directional control with rudder and nosewheel steering. If hydraulic pressure is available, braking (anti-skid off) may be available. Refer to **Anti-Skid Off Operation**, this section. Be prepared to use EMER BRAKE. Refer to **Emergency Braking** procedure, Section III.

15. Thrust Levers — CUTOFF at touchdown.
16. ENG FIRE PULL T-handles — Pull.
17. After aircraft stops, BATTERY Switches — OFF.
18. Evacuate the aircraft:
    a. **Cabin Entry Door** — Open and exit aircraft. The upper door may be opened with the landing gear retracted.
    b. **Aft Cabin Door** — Open and exit using the wing step area.

Thrust Reverser Deployed Landing

1. Complete **Descent** procedure, Section II.
2. Circuit Breakers — Set, or as required.
3. Systems Pressure — Check:
   a. HYD PRESS — 1500 to 1575 psi.
   b. GEAR AIR and BRAKE AIR — 1800 to 3000 psi.
4. Final Approach Speed — 1.3 Vs (Flaps 20°).
5. Normal Landing Distance — Multiply by 1.2
6. Crew Approach Briefing — Complete.
7. CABIN CLIMATE Controls (inhibit system compressor cycling):
   a. ●**If cooling system is *not* desired:**
      (1) COOL Switch — OFF.
   a. ●**If cooling system is desired:**
      (1) COOL Switch — COOL.
      (2) Cabin AUTO-MAN Switch — MAN.
      (3) Cabin COLD-HOT Knob — COLD.
8. SPOILER Lever — ARM.
9. LANDING GEAR Switch — DN. Check for three green DOWN indications.
10. NOSE STEER Switch — ARM.
11. LDG LT-TAXI Switches — As required.
12. L and R ANTI-SKID Lights — Extinguished.
13. Landing Configuration — Flaps - 20°
14. HYD PRESS Gage — Check (1500 to 1575 psi).
15. IGNITION Switch (operative engine) — On.
16. Autopilot — Disengage.
17. Yaw Damper — As desired.

NOTE

After landing, use of the operative thrust reverser is allowable.

Failure of Thrust Reverser to Stow after Landing

1. Affected TR CONT and TR AUTO STOW Circuit Breakers (ENGINE group) — Set.
2. Affected Thrust Reverser Lever — Deploy, then stow.
3. *If thrust reverser does not stow,* Affected Thrust Lever — CUTOFF.

TR ARM Light in Flight

If the green TR ARM light illuminates steady in flight, it is most likely an annunciator light panel malfunction.

If the TR ARM light flashes in flight, it indicates that hydraulic pressure is available for thrust reverser operation. This is not a normal condition while airborne.

1. Affected TR AUTO STOW circuit breaker (ENGINE group) — Set.
2. Affected thrust lever — IDLE.
3. Airspeed — Reduce to 200 KIAS or 0.70 MI, whichever is less.
4. Affected TR CONT circuit breaker (ENGINE group) — Pull and allow time for thrust reverser system hydraulic pressure to bleed off.

5. ● **If TR ARM light goes out:**
   a. TR CONT Circuit Breaker — Leave pulled.
   b. Affected Thrust Lever — As required; continue flight.
   c. This checklist is complete.

5. ● **If TR ARM light does *not* go out:**
   a. TR CONT Circuit Breaker — Reset.
   b. TR AUTO STOW Circuit Breaker — Pull.
   c. ■ **If TR ARM light goes out:**
      (1) TR AUTO STOW Circuit Breaker — Leave pulled.
      (2) Affected Thrust Lever — As required; continue flight.
      (3) This checklist is complete.
   c. ■ **If TR ARM light does *not* go out:**
      (1) TR AUTO STOW Circuit Breaker — Reset.
      (2) Land as soon as practical.

TR UNLOCK Light Illuminated

Illumination of an amber TR UNLOCK light indicates the associated thrust reverser is not stowed and locked. This light will illuminate during a normal deploy and stow cycle. However, illumination when a normal deploy or stow has not been commanded, indicates an unlocked condition. **Do not** dispatch with this condition.

On aircraft 60-041 & subsequent and prior aircraft modified by SB 60-78-2, if the TR UNLOCK light illuminates in flight and engine roll-back does not occur, the most likely cause is a secondary latch malfunction. If TR UNLOCK light is accompanied by an engine roll-back, refer to **TR UNLOCK/TR DEPLOY and ENG CMPTR Lights Illuminated In Flight** procedure, Section III.

1. Affected TR CONT and TR AUTO STOW circuit breakers (ENGINE group) — Set.
2. Continue flight monitoring engine instruments and thrust reverser annunciators.
3. Land as soon as practical. Thrust reversers may be used after landing.
4. Refer problem to maintenance personnel for correction prior to next flight.

Turbulent Air Penetration

Flight through severe turbulence should be avoided if possible. When flying at 30,000 feet or higher, it is not advisable to avoid a turbulent area by climbing over it unless it is obvious that it can be overflown well in the clear. For turbulence of the same intensity, greater buffet margins are achieved by flying the recommended speeds at reduced altitude.

1. Airspeed — 250 KIAS or 0.73 MI, whichever is less. Severe turbulence will cause large and often rapid variations in indicated airspeed. **Do not chase the airspeed**.
2. IGNITION Switches — On.
3. Thrust — Make an initial thrust setting for the target airspeed. **Change thrust only in the case of extreme airspeed variation**.
4. Attitude — Maintain wings level and desired pitch attitude. Use attitude indicator as the primary instrument. In extreme drafts, large altitude changes may occur. **Do not use sudden large control movements**.
5. Stabilizer — Maintain control of the airplane with the elevators. After establishing the trim setting for penetration speed, **do not change the stabilizer trim**.
6. Altitude — Allow the altitude to vary. Large altitude variations are possible in severe turbulence. Sacrifice altitude in order to maintain the desired attitude and airspeed. **Do not chase altitude**.
7. Yaw Damper — Engaged.
8. *If severe turbulence is penetrated with autopilot engaged,* use attitude hold mode with turbulence (TURB) mode engaged.

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INTRODUCTION TO PERFORMANCE DATA

REGULATORY COMPLIANCE

Information in this section is presented for the purpose of compliance with the appropriate performance criteria and certification requirements of FAR 25.

STANDARD PERFORMANCE CONDITIONS

All performance in this section is based on flight test data and the following performance conditions:

1. Pertinent thrust ratings less installation, airbleed, and accessory losses.
2. Full temperature and altitude accountability within the operational limits for which the airplane is certified.



Should OAT or altitude be below the lowest value shown on the performance charts, use performance at the lowest value shown.

3. Wing flap positions are as follows:
   Takeoff ..... 8° or 20°
   Enroute ..... UP — 0°
   Approach ..... 8°
   Landing ..... DN — 40°
4. Power settings (N_1) from the appropriate charts or tables and indicated by the N_1 bugs.
5. All takeoff and landing performance is based on a paved, dry runway.
6. The takeoff performance was obtained using the following procedures and conditions:

   ENGINE-OUT TAKEOFF — ACCELERATE GO

   a. The thrust lever was set static to the takeoff (T/O) power position, and then the brakes were released.
   b. The pilot recognized engine failure at V_1.
   c. The airplane continued to accelerate to V_R at which time positive rotation to +9 degrees nose up pitch attitude was made.
   d. The landing gear was retracted when a positive climb rate was established.
   e. V_2 was achieved at or prior to the 35-foot point above the runway.

ENGINE-OUT TAKEOFF — ACCELERATE STOP

a. The thrust lever was set static to the takeoff (T/O) power position, and then the brakes were released.
b. The pilot recognized the necessity to stop because of engine failure just prior to V1.
c. Maximum pilot braking effort was started at V1 and continued until the airplane came to a stop.
d. Both thrust levers were brought to IDLE.
e. The spoilers were deployed (either manual or auto).

MULTI-ENGINE TAKEOFF

a. The thrust levers were set static to the takeoff (T/O) power position, and then the brakes were released.
b. Positive rotation to +9 degrees nose up pitch attitude was made at VR.
c. The landing gear was retracted when a positive climb rate was established.
d. V2 + 8 KIAS was achieved at or prior to the 35-foot point above the runway.

7. The landing performance was obtained using the following procedures and conditions:

LANDING

a. Approached at VREF with flaps and gear down using thrust as required to maintain a 3° glideslope. Targeted touchdown approximately 1000 feet from end of runway.
b. At the 50-foot point, a slight reduction in thrust was made. At 25 feet, thrust levers were briskly moved to IDLE.
c. A firm touchdown was accomplished with little or no flare.
d. After touchdown, maximum braking was applied until the airplane came to a full stop.
e. • *On aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6,* spoilers were deployed manually.
   • *On aircraft 60-079, 60-094 and subsequent, and prior aircraft incorporating SB 60-27-6,* spoilers were deployed manually or automatically as indicated on the applicable chart.

VARIABLE FACTORS AFFECTING PERFORMANCE

Details of variables affecting performance are given with the charts to which they apply. Conditions which relate to all performance calculations are:

1. Cabin Air — ON.
2. Effect of humidity.
3. Winds, for which graphical correction is presented on the charts, are to be taken as the reported winds. Factors for 50% headwind component and 150% tailwind component have been applied as prescribed in pertinent regulations.
4. The percentages of stall speed are calculated from speeds as expressed in calibrated airspeed (KCAS).

DEFINITIONS

These definitions apply to terms used throughout this manual.

AIRSPEEDS

CAS	Calibrated Airspeed — The airspeed indicator reading corrected for instrument and position error. KCAS is calibrated airspeed expressed in knots.
IAS	Indicated Airspeed — The airspeed indicator reading as installed in the airplane. KIAS is indicated airspeed expressed in knots. The information in this manual is presented in terms of indicated airspeed, unless otherwise stated, and assumes zero instrument error. The ground airspeed calibration was adjusted to account for the lag in the electronic airspeed indicator.
M	Calibrated Mach Number — The Machmeter reading corrected for instrument and position error.
MI	Indicated Mach Number — The Machmeter reading as installed in the airplane. Zero instrument error is assumed for presentations in this manual.
VA	Maneuvering Speed — VA is the highest speed that full aileron and rudder control can be applied without overstressing the aircraft, or the speed at which the aircraft will stall with a load factor of 3.0 g's, whichever is less.
VFE	Maximum Flap Extended Speed — The maximum speed permissible with the wing flaps in a prescribed extended position.
VLE	Maximum Landing Gear Extended Speed — The maximum speed at which the aircraft can be safely flown with the landing gear extended.
VLO	Maximum Landing Gear Operating Speed — The maximum speed at which the landing gear can be safely extended or retracted.
VLOF	Lift-off Speed — The actual speed of the aircraft at lift-off.
VMO/MMO	Maximum Operating Limit Speed — The speed that may not be deliberately exceeded in any regime of flight (climb, cruise, or descent) unless a higher speed is authorized for flight test. VMO is expressed in knots. MMO is expressed in Mach number.
VS0	VS0 is the stalling speed in the landing configuration.

DEFINITIONS (Cont)

V_{S1}	V_{S1} is the stalling speed in the appropriate gear/flap configuration.
V_{MCA}	Minimum Control Speed, Air — The minimum flight speed at which the airplane is controllable with up to 5° of bank when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust.
V_{MCG}	Minimum Control Speed, Ground — The minimum speed on the ground at which control can be maintained using aerodynamic controls alone, when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust.
V_{MCL}	Minimum Control Speed, Landing — The minimum flight speed during landing approach at which the airplane is controllable with up to 5° of bank when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff thrust. V_{MCL} has been determined to be not more than 107 KIAS in the landing configuration.
V_1	Takeoff Decision Speed — The speed at which the distance to continue the takeoff to 35 feet or the distance to stop will not exceed the scheduled takeoff distance provided the brakes are applied at V_1.
V_R	Rotation Speed — The speed at which rotation is initiated during takeoff to attain takeoff performance.
V_2	Takeoff Safety Speed — The actual speed at 35 feet above the runway surface as demonstrated in flight during single-engine takeoff. V_2 must not be less than 1.2 times the stalling speed, or less than 1.1 times the air minimum control speed (V_{MCA}), or less than the rotation speed (V_R) plus an increment in speed attained prior to reaching a 35-foot height above the runway surface.
V_{APP}	Approach Climb Speed — The airspeed equal to 1.3 V_{S1} (airplane in the approach configuration).
V_{REF}	Landing Approach Speed — The airspeed equal to 1.3 V_{S0} (airplane in the landing configuration).
1.3 V_S	Landing approach speed for abnormal operations in which flaps are not full down. Values are presented for flaps 0°, 8°, and 20°. These speeds provide the same margin above stall as when flying a normal approach with flaps full down at V_{REF}.

DEFINITIONS (Cont)

WEIGHTS

Maximum Allowable Takeoff Weight

The maximum allowable takeoff weight at the start of takeoff roll is limited by the most restrictive of the following requirements:

- Maximum Certified Takeoff Weight.
- Maximum Takeoff Weight (Climb or Brake Energy Limited) for altitude and reported surface temperature as determined from the applicable figure entitled TAKEOFF WEIGHT LIMITS in this section.
- Maximum Takeoff Weight for the runway and ambient conditions as determined from the applicable figure entitled TAKEOFF FIELD LENGTH in this section.

Maximum Allowable Landing Weight

The maximum allowable landing weight is limited by the most restrictive of the following requirements:

- Maximum Certified Landing Weight.
- Maximum Landing Weight for the runway and ambient conditions as determined from the applicable ACTUAL LANDING DISTANCE chart in this section.
- Maximum Landing Weight (Approach Climb or Brake Energy Limited) for altitude and reported surface temperature as determined from the applicable figure entitled LANDING WEIGHT LIMITS in this section.

DISTANCES

Accelerate-Stop Distance

The accelerate-stop distance is the horizontal distance traversed from brake release to the point at which the airplane comes to a complete stop on a takeoff during which the pilot applies the brakes at or below V1.

Engine-Out Accelerate-Go Distance

The engine-out accelerate-go distance is the horizontal distance traversed from brake release to the point at which the airplane attains a height of 35 feet above the runway surface, on a takeoff during which one engine fails, recognition occurs at or above V1 and the pilot elects to continue.

DEFINITIONS (Cont)

Takeoff Field Length

The takeoff field lengths presented on the TAKEOFF FIELD LENGTH charts in this section are based on a smooth, dry, paved runway. The takeoff field length given for each combination of airplane weight, atmospheric temperature, altitude, wind, and runway gradient is the greatest of the following:

1. 115% of the all-engine takeoff distance from start to a height of 35 feet above the runway surface.
2. The accelerate-stop distance.
3. The engine-out accelerate-go distance.

No specific identification is made on the charts as to which of the above distances governs a specific case. However, in all cases for which charts are furnished, the field length is governed by either 2 or 3 above as 1 is shorter than either.

Generally, the takeoff field lengths presented are balanced; that is, the accelerate-go distance will be equal to the accelerate-stop distance. However, when V_1 is limited by either V_R or V_{MCG} the relationship is altered as follows:

- **Accelerate-go Limited** — When V_1 is limited by V_R, the accelerate-go distance will be longer than the accelerate-stop distance.
- **Accelerate-stop Limited** — When V_1 is limited by V_{MCG}, the accelerate-stop distance will be longer than the accelerate-go distance.

Actual Landing Distance

The actual landing distances presented in this section are based on a smooth, dry, paved runway. The actual landing distance is equal to the horizontal distance from a point 50 feet above the runway surface to the point at which the airplane would come to a full stop on the runway.

Factored Landing Distance

The factored landing distances presented in this section are equal to the actual landing distance divided by 0.60 (multiplied by 1.67).

DEFINITIONS (Cont)

METEOROLOGICAL

ISA	International Standard Atmosphere.
OAT	Outside ambient air temperature obtained from ground meteorological sources. (OAT is equivalent to SAT.)
SAT	Static Air Temperature — The ram air temperature obtained from onboard temperature measurement adjusted for compressibility effects. (SAT is equivalent to OAT.)
RAT	Ram Air Temperature — The inflight measured air temperature and includes full isentropic compression rise corresponding to the calibrated Mach number.
Altitude	All altitudes given in this section are pressure altitudes unless otherwise stated.
Wind	The wind velocities recorded as variables on the charts of this section are to be understood as the headwind or tailwind components of the actual winds at 10 meters above the runway surface (tower winds).
Demonstrated Crosswind	The demonstrated crosswind velocity of 29 knots is the velocity of the reported tower winds (measured at a 10 meter height) for which adequate control of the airplane during takeoff and landing (including the use of thrust reversers) was actually demonstrated during certification tests. Adequate control of the airplane during landing with spoilerons inoperative was demonstrated with a crosswind velocity of 25 knots. The values shown are not considered to be limiting.

MISCELLANEOUS

Position Correction	Static Position Correction — A correction applied to indicated airspeed or altitude to eliminate the effect of the location of the static pressure source on the instrument reading. Any change in the airspeed-altitude system external to the airplane, or locating any external object near the pressure pickup sources, requires calibration of the system and revision of the charts.

DEFINITIONS (Cont)

Maximum Takeoff Brake Energy	The maximum brake energy demonstrated during emergency stop tests. Maximum effort braking at weights associated with the takeoff brake energies shown on the TAKEOFF WEIGHT LIMITS charts will meet the accelerate-stop distances expressed on the TAKEOFF FIELD LENGTH charts if the takeoff is aborted and brakes are applied at V1. However, after the stop, wheel fuse plugs will release and brake and tire damage will occur.
Maximum Landing Brake Energy	The maximum brake energy demonstrated during landing tests. Maximum effort braking at weights associated with the landing brake energies shown on the LANDING WEIGHT LIMITS charts will meet the stopping distances expressed on the ACTUAL LANDING DISTANCE chart. Landings in which brake energy is kept below this value can be accomplished without wheel fuse plug release or tire damage. Maximum effort stops in which brake energy exceeds this value may cause excessive brake wear, and after the stop, may cause wheel fuse plug release and damage tires.
Maximum Turn-Around Brake Energy	The maximum brake energy that when coupled with a rejected takeoff maintains wheel integrity. After maximum effort stops in which brake energy exceeds this value, as expressed on the applicable LANDING WEIGHT LIMITS chart, the brakes and wheels must be allowed to cool before attempting another takeoff. Refer to the turn-around limits presented in Section I of this manual.
Runway Gradient	Change in runway elevation per 100 feet of runway length. The values given are positive for uphill gradients and negative for downhill gradients.
Gradient of Climb	The ratio of the change in height during a portion of the climb to the horizontal distance traversed in the same time interval.
Gross Climb Gradient	The climb gradient that the airplane can actually achieve given ideal conditions.
Net Climb Gradient	The gross climb gradient reduced by 0.8% during the takeoff phase and 1.1% enroute. This conservatism is required by FAR 25 for takeoff flight path determination to account for variables encountered in service.

DEFINITIONS (Cont)

First Segment Climb	Climb from the point at which the airplane becomes airborne to the point at which the landing gear is fully retracted. The gross climb gradient with one engine not operating and the other engine at takeoff thrust must be positive, without ground effect. This requirement is satisfied by observing the TAKEOFF WEIGHT LIMITS Chart. Airspeed increase is from lift-off airspeed (V_{LOF}) to V_2 with gradient calculated at the most limiting of the two conditions.
Second Segment Climb	Second segment climb is calculated at a height of 400 feet. The gross climb gradient may not be less than 2.4% with one engine not operating and the other engine at takeoff thrust. This requirement is satisfied by observing the TAKEOFF WEIGHT LIMITS Chart. Airspeed for this segment is V_2.
Final Segment Climb	Final segment climb is calculated at a height of 1500 feet. The gross climb gradient may not be less than 1.2% with one engine not operating and the other engine at maximum continuous thrust. This requirement is satisfied by observing the TAKEOFF WEIGHT LIMITS Chart. Airspeed for this segment is 1.25 V_{S1}. The final segment climb gradients are used if the required obstacle clearance is greater than 1500 feet AGL.
Enroute Climb	Climb with flaps UP (0°), landing gear retracted and maximum continuous thrust on one engine. There is no minimum requirement for enroute climb gradients. The enroute net climb gradients are presented for pilot's reference. Airspeed is presented in ENROUTE CLIMB SPEED SCHEDULE Chart.
Approach Climb	Climb from a missed or aborted approach with approach (8°) flaps, landing gear retracted, and takeoff thrust on one engine. The gross climb gradient may not be less than 2.1% This requirement is satisfied by observing the LANDING WEIGHT LIMITS Chart. Airspeed for this segment is 1.3 V_{S1}.
Landing Climb	Climb from an aborted landing with landing flaps DN (40°), landing gear extended, and takeoff thrust on both engines. The gross climb gradient may not be less than 3.2%. This requirement is satisfied by observing the LANDING WEIGHT LIMITS Chart. Airspeed for this segment is 1.3 V_{S0}.

DEFINITIONS (Cont)

The configurations referred to by name in the charts correspond to the following settings:

Configuration	Engines Operating	Thrust	Flap Setting	Gear
1st Segment Takeoff Climb	1	Takeoff	8° or 20°	DOWN
2nd Segment Takeoff Climb	1	Takeoff	8° or 20°	UP
Final Segment Climb	1	Max. Cont.	UP-0°	UP
Enroute Climb	1	Max. Cont.	UP-0°	UP
Approach Climb	1	Takeoff	8°	UP
Landing Climb	2	Takeoff	DN-40°	DOWN

NOISE LEVELS

The noise levels are in compliance with the requirements of 14 CFR Part 36 (Stage 3) which are essentially equivalent to the requirements outlined in ICAO Annex 16, Chapter 3.

No determination has been made by the Federal Aviation Administration that the noise levels in this manual are or should be acceptable or unacceptable for operation at, into, or out of any airport.

These noise values are stated for reference conditions of standard atmospheric pressure at sea level, 77°F (25°C) ambient temperature, 70% relative humidity, and zero wind.

CERTIFIED NOISE LEVELS

The noise levels established in compliance with 14 CFR Part 36 (Stage 3) are:

NOISE LEVEL IN EPNdB

CONDITION	ACTUAL	MAXIMUM ALLOWABLE
Sideline 23,500 lb (10,659 kg)	83.1	94
Takeoff 23,500 lb (10,659 kg)	70.8	89
Approach 19,500 lb (8845 kg)	87.7	98

Continued

NOISE LEVELS (Cont)

Takeoff and sideline noise levels were obtained at the maximum takeoff weights listed above, 162 knots climb speed, 8° flaps, and anti-ice systems off. Thrust was reduced from takeoff N1 %RPM to 79.2% N1 at 2500 feet AGL.

Landing approach noise levels were established with gear down, maximum landing weights listed above, approach speed of 140 knots, and 40° flaps. No special noise abatement procedures were used.

SUPPLEMENTAL NOISE LEVELS

The following noise levels provide additional information to the certified noise levels.

The noise levels established in compliance with 14 CFR Part 36 (Stage 3) are:

NOISE LEVEL IN EPNdB

CONDITION	ACTUAL	MAXIMUM ALLOWABLE
Sideline 23,500 lb (10,659 kg)	83.2	94
Takeoff 23,500 lb (10,659 kg)	78.9	89

Takeoff and sideline noise levels were obtained at the maximum takeoff weights listed above, 162 knots climb speed, 8° flaps, anti-ice systems off, and all engine takeoff with takeoff thrust setting.

RELATION OF TEMPERATURE (°C) TO ISA

EFFECTIVITY
All

ALTITUDE - 1000 FT	-50°C	-40°C	-30°C	-20°C	-10°C	ISA	+10°C	+20°C	+30°C
51	-106.5	-96.5	-86.5	-76.5	-66.5	-56.5	-46.5	-36.5	-26.5
37	-106.5	-96.5	-86.5	-76.5	-66.5	-56.5	-46.5	-36.5	-26.5
35	-104.2	-94.2	-84.2	-74.2	-64.2	-54.2	-44.2	-34.2	-24.2
33	-100.3	-90.3	-80.3	-70.3	-60.3	-50.3	-40.3	-30.3	-20.3
31	-96.3	-86.3	-76.3	-66.3	-56.3	-46.3	-36.3	-26.3	-16.3
30	-94.4	-84.4	-74.4	-64.4	-54.4	-44.4	-34.4	-24.4	-14.4
29	-92.4	-82.4	-72.4	-62.4	-52.4	-42.4	-32.4	-22.4	-12.4
28	-90.4	-80.4	-70.4	-60.4	-50.4	-40.4	-30.4	-20.4	-10.4
27	-88.4	-78.4	-68.4	-58.4	-48.4	-38.4	-28.4	-18.4	-8.4
26	-86.5	-76.5	-66.5	-56.5	-46.5	-36.5	-26.5	-16.5	-6.5
25	-84.5	-74.5	-64.5	-54.5	-44.5	-34.5	-24.5	-14.5	-4.5
24	-82.5	-72.5	-62.5	-52.5	-42.5	-32.5	-22.5	-12.5	-2.5
23	-80.5	-70.5	-60.5	-50.5	-40.5	-30.5	-20.5	-10.5	-0.5
22	-78.6	-68.6	-58.6	-48.6	-38.6	-28.6	-18.6	-8.6	1.4
21	-76.6	-66.6	-56.6	-46.6	-36.6	-26.6	-16.6	-6.6	3.4
20	-74.6	-64.6	-54.6	-44.6	-34.6	-24.6	-14.6	-4.6	5.4
19	-72.6	-62.6	-52.6	-42.6	-32.6	-22.6	-12.6	-2.6	7.4
18	-70.6	-60.6	-50.6	-40.6	-30.6	-20.6	-10.6	-0.6	9.4
16	-66.7	-56.7	-46.7	-36.7	-26.7	-16.7	-6.7	3.3	13.3
14	-62.7	-52.7	-42.7	-32.7	-22.7	-12.7	-2.7	7.3	17.3
12	-58.8	-48.8	-38.8	-28.8	-18.8	-8.8	1.2	11.2	21.2
10	-54.8	-44.8	-34.8	-24.8	-14.8	-4.8	5.2	15.2	25.2
8	-50.8	-40.8	-30.8	-20.8	-10.8	-0.8	9.2	19.2	29.2
6	-46.9	-36.9	-26.9	-16.9	-6.9	3.1	13.1	23.1	33.1
4	-42.9	-32.9	-22.9	-12.9	-2.9	7.1	17.1	27.1	37.1
2	-39.0	-29.0	-19.0	-9.0	1.0	11.0	21.0	31.0	41.0
S.L.	-35.0	-25.0	-15.0	-5.0	5.0	15.0	25.0	35.0	45.0
	-50°C	-40°C	-30°C	-20°C	-10°C	ISA	+10°C	+20°C	+30°C

Figure 5-1

TEMPERATURE CONVERSION

EFFECTIVITY

All

- To convert from Celsius to Fahrenheit, find, in the bold face columns, the number representing the Celsius temperature to be converted. The equivalent Fahrenheit temperature is read in the adjacent column headed °F.
- To convert from Fahrenheit to Celsius, find, in the bold face columns, the number representing the Fahrenheit temperature to be converted. The equivalent Celsius temperature is read in the adjacent column headed °C.

°F		°C	°F		°C	°F		°C	°F		°C	°F		°C
-148 0	**-100**	-73.3	-58.0	**-50**	-45.6	32.0	**0**	-17 8	122.0	**50**	10.0	212.0	**100**	37.8
-146.2	**-99**	-72.8	-56.2	**-49**	-45.0	33.8	**1**	-17.2	123.8	**51**	10.6	213.8	**101**	38.3
-144.4	**-98**	-72.2	-54.4	**-48**	-44.4	35.6	**2**	-16.7	125.6	**52**	11.1	215.6	**102**	38.9
-142.6	**-97**	-71 7	-52.6	**-47**	-43.9	37.4	**3**	-16.1	127.4	**53**	11 7	217.4	**103**	39.4
-140.8	**-96**	-71.1	-50.8	**-46**	-43.3	39.2	**4**	-15.6	129.2	**54**	12 2	219.2	**104**	40.0
-139.0	**-95**	-70.6	-49.0	**-45**	-42.8	41.0	**5**	-15.0	131.0	**55**	12.8	221 0	**105**	40.6
-137.2	**-94**	-70.0	-47.2	**-44**	-42.2	42.8	**6**	-14.4	132.8	**56**	13.3	222.8	**106**	41.1
-135.4	**-93**	-69.4	-45.4	**-43**	-41.7	44.6	**7**	-13.9	134.6	**57**	13.9	224.6	**107**	41.7
-133.6	**-92**	-68.9	-43.6	**-42**	-41.1	46.4	**8**	-13.3	136.4	**58**	14.4	226.4	**108**	42.2
-131.8	**-91**	-68.3	-41 8	**-41**	-40.6	48.2	**9**	-12.8	138.2	**59**	15.0	228.2	**109**	42.8
-130.0	**-90**	-67.8	-40 0	**-40**	-40.0	50.0	**10**	-12.2	140.0	**60**	15.6	230.0	**110**	43.3
-128.2	**-89**	-67.2	-38.2	**-39**	-39.4	51.8	**11**	-11.7	141.8	**61**	16.1	231.8	**111**	43.9
-126.4	**-88**	-66 7	-36.4	**-38**	-38.9	53.6	**12**	-11.1	143 6	**62**	16.7	233.6	**112**	44.4
-124 6	**-87**	-66.1	-34.6	**-37**	-38.3	55 4	**13**	-10.6	145.4	**63**	17.2	235.4	**113**	45.0
-122.8	**-86**	-65 6	-32.8	**-36**	-37.8	57.2	**14**	-10 0	147.2	**64**	17 8	237.2	**114**	45.6
-121.0	**-85**	-65 0	-31.0	**-35**	-37.2	59.0	**15**	-9.4	149.0	**65**	18 3	239.0	**115**	46.1
-119 2	**-84**	-64 4	-29.2	**-34**	-36.7	60.8	**16**	-8.9	150 8	**66**	18 9	240 8	**116**	46.7
-117.4	**-83**	-63.9	-27.4	**-33**	-36.1	62.6	**17**	-8.3	152.6	**67**	19.4	242.6	**117**	47.2
-115.6	**-82**	-63.3	-25 6	**-32**	-35.6	64.4	**18**	-7.8	154.4	**68**	20 0	244.4	**118**	47.8
-113 8	**-81**	-62.8	-23.8	**-31**	-35.0	66 2	**19**	-7 2	156.2	**69**	20 6	246.2	**119**	48.3
-112.0	**-80**	-62 2	-22.0	**-30**	-34 4	68.0	**20**	-6 7	158 0	**70**	21.1	248.0	**120**	48.9
-110 2	**-79**	-61.7	-20.2	**-29**	-33.9	69.8	**21**	-6 1	159 8	**71**	21 7	249.8	**121**	49.4
-108 4	**-78**	-61.1	-18.4	**-28**	-33.3	71 6	**22**	-5.6	161.6	**72**	22 2	251.6	**122**	50 0
-106 6	**-77**	-60 6	-16.6	**-27**	-32.8	73.4	**23**	-5 0	163 4	**73**	22.8	253.4	**123**	50.6
-104.8	**-76**	-60.0	-14.8	**-26**	-32 2	75.2	**24**	-4 4	165 2	**74**	23 3	255 2	**124**	51 1
-103.0	**-75**	-59.4	-13 0	**-25**	-31.7	77.0	**25**	-3.9	167.0	**75**	23 9	257.0	**125**	51.7
-101.2	**-74**	-58.9	-11.2	**-24**	-31.1	78.8	**26**	-3.3	168.8	**76**	24.4	258.8	**126**	52 2
-99.4	**-73**	-58.3	-9.4	**-23**	-30 6	80.6	**27**	-2 8	170.6	**77**	25.0	260 6	**127**	52.8
-97.6	**-72**	-57.8	-7.6	**-22**	-30.0	82 4	**28**	-2 2	172.4	**78**	25.6	262 4	**128**	53 3
-95 8	**-71**	-57.2	-5 8	**-21**	-29.4	84.2	**29**	-1.7	174.2	**79**	26.1	264.2	**129**	53 9
-94.0	**-70**	-56.7	-4.0	**-20**	-28.9	86.0	**30**	-1.1	176.0	**80**	26.7	266 0	**130**	54.4
-92.2	**-69**	-56 1	-2.2	**-19**	-28.3	87.8	**31**	-0.6	177.8	**81**	27.2	267.8	**131**	55.0
-90.4	**-68**	-55.6	-0.4	**-18**	-27.8	89.6	**32**	0.0	179.6	**82**	27.8	269.6	**132**	55.6
-88.6	**-67**	-55.0	1.4	**-17**	-27.2	91.4	**33**	0.6	181.4	**83**	28.3	271.4	**133**	56.1
-86.8	**-66**	-54.4	3.2	**-16**	-26.7	93.2	**34**	1.1	183.2	**84**	28.9	273.2	**134**	56.7
-85.0	**-65**	-53.9	5.0	**-15**	-26.1	95 0	**35**	1.7	185.0	**85**	29.4	275.0	**135**	57.2
-83.2	**-64**	-53.3	6 8	**-14**	-25.6	96.8	**36**	2.2	186.8	**86**	30.0	276.8	**136**	57.8
-81.4	**-63**	-52.8	8.6	**-13**	-25.0	98.6	**37**	2.8	188.6	**87**	30.6	278 6	**137**	58 3
-79.6	**-62**	-52.2	10.4	**-12**	-24.4	100.4	**38**	3.3	190 4	**88**	31 1	280.4	**138**	58.9
-77.8	**-61**	-51.7	12.2	**-11**	-23 9	102 2	**39**	3.9	192.2	**89**	31 7	282 2	**139**	59.4
-76.0	**-60**	-51.1	14.0	**-10**	-23.3	104.0	**40**	4.4	194.0	**90**	32.2	284.0	**140**	60.0
-74.2	**-59**	-50 6	15.8	**-9**	-22.8	105.8	**41**	5 0	195 8	**91**	32.8	285.8	**141**	60.6
-72.4	**-58**	-50.0	17.6	**-8**	-22.2	107.6	**42**	5.6	197.6	**92**	33.3	287.6	**142**	61.1
-70 6	**-57**	-49.4	19.4	**-7**	-21.7	109.4	**43**	6.1	199.4	**93**	33.9	289.4	**143**	61.7
-68.8	**-56**	-48 9	21.2	**-6**	-21.1	111 2	**44**	6.7	201.2	**94**	34 4	291.2	**144**	62.2
-67 0	**-55**	-48.3	23.0	**-5**	-20.6	113.0	**45**	7.2	203.0	**95**	35.0	293.0	**145**	62 8
-65 2	**-54**	-47.8	24 8	**-4**	-20.0	114.8	**46**	7.8	204.8	**96**	35.6	294 8	**146**	63.3
-63 4	**-53**	-47.2	26.6	**-3**	-19.4	116 6	**47**	8 3	206.6	**97**	36.1	296 6	**147**	63.9
-61.6	**-52**	-46.7	28 4	**-2**	-18 9	118.4	**48**	8.9	208 4	**98**	36 7	298.4	**148**	64 4
-59 8	**-51**	-46.1	30.2	**-1**	-18.3	120.2	**49**	9.4	210.2	**99**	37.2	300 2	**149**	65 0

Figure 5-2

LINEAR CONVERSIONS

EFFECTIVITY
All

- To convert from meters to feet, find, in the bold face columns, the number of meters to be converted. The equivalent number of feet is read in the adjacent column headed FEET.
- To convert from feet to meters, find, in the bold face columns, the number of feet to be converted. The equivalent number of meters is read in the adjacent column headed METERS.

METERS	◄►	FEET	METERS	◄►	FEET	METERS	◄►	FEET
304.8	1000	3280.8	1341.1	4400	14435.5	2377.5	7800	25590.2
335.3	1100	3608.9	1371.6	4500	14763.6	2407.9	7900	25918.3
365.8	1200	3937.0	1402.1	4600	15091.7	2438.4	8000	26246.4
396.2	1300	4265.0	1432.6	4700	15419.8	2468.9	8100	26574.5
426.7	1400	4593.1	1463.1	4800	15747.8	2499.4	8200	26902.6
457.2	1500	4921.2	1493.5	4900	16075.9	2529.9	8300	27230.6
487.7	1600	5249.3	1524.0	5000	16404.0	2560.4	8400	27558.7
518.2	1700	5577.4	1554.5	5100	16732.1	2590.8	8500	27886.8
548.6	1800	5905.4	1585.0	5200	17060.2	2621.3	8600	28214.9
579.1	1900	6233.5	1615.5	5300	17388.2	2651.8	8700	28543.0
609.6	2000	6561.6	1645.9	5400	17716.3	2682.3	8800	28871.0
640.1	2100	6889.7	1676.4	5500	18044.4	2712.8	8900	29199.1
670.6	2200	7217.8	1706.9	5600	18372.5	2743.2	9000	29527.2
701.0	2300	7545.8	1737.4	5700	18700.6	2773.7	9100	29855.3
731.5	2400	7873.9	1767.9	5800	19028.6	2804.2	9200	30183.4
762.0	2500	8202.0	1798.3	5900	19356.7	2834.7	9300	30511.4
792.5	2600	8530.1	1828.8	6000	19684.8	2865.2	9400	30839.5
823.0	2700	8858.2	1859.3	6100	20012.9	2895.6	9500	31167.6
853.5	2800	9186.2	1889.8	6200	20341.0	2926.1	9600	31495.7
883.9	2900	9514.3	1920.3	6300	20669.0	2956.6	9700	31823.8
914.4	3000	9842.4	1950.7	6400	20997.1	2987.1	9800	32151.8
944.9	3100	10170.5	1981.2	6500	21325.2	3017.6	9900	32479.9
975.4	3200	10498.6	2011.7	6600	21653.3	3048.0	10000	32808.0
1005.9	3300	10826.6	2042.2	6700	21981.4	3352.8	11000	36088.8
1036.3	3400	11154.7	2072.7	6800	22309.4	3657.6	12000	39369.6
1066.8	3500	11482.8	2103.1	6900	22637.5	3962.4	13000	42650.4
1097.3	3600	11810.9	2133.6	7000	22965.6	4267.3	14000	45931.2
1127.8	3700	12139.0	2164.1	7100	23293.7	4572.1	15000	49212.0
1158.3	3800	12467.0	2194.6	7200	23621.8	4876.9	16000	52492.8
1188.7	3900	12795.1	2225.1	7300	23949.8	5181.7	17000	55773.6
1219.2	4000	13123.2	2255.5	7400	24277.9	5486.5	18000	59054.4
1249.7	4100	13451.3	2286.0	7500	24606.0	5791.3	19000	62335.2
1280.2	4200	13779.4	2316.5	7600	24934.1	6096.1	20000	65616.0
1310.7	4300	14107.4	2347.0	7700	25262.2	6400.9	21000	68896.8

Figure 5-3

VOLUME CONVERSIONS

EFFECTIVITY
All

- To convert from liters to gallons, find, in the bold face columns, the number of liters to be converted. The equivalent number of gallons is read in the adjacent column headed GALLONS.
- To convert from gallons to liters, find, in the bold face columns, the number of gallons to be converted. The equivalent number of liters is read in the adjacent column headed LITERS.

LITERS	◄►	GALLONS	LITERS	◄►	GALLONS	LITERS	◄►	GALLONS
18.9	**5**	1.3	1476.2	**390**	103.0	2952.3	**780**	206.1
37.9	**10**	2.6	1514.0	**400**	105.7	2990.2	**790**	208.7
75.7	**20**	5.3	1551.9	**410**	108.3	3028.0	**800**	211.4
113.6	**30**	7.9	1589.7	**420**	111.0	3065.9	**810**	214.0
151.4	**40**	10.6	1627.6	**430**	113.6	3103.7	**820**	216.6
189.3	**50**	13.2	1665.4	**440**	116.2	3141.6	**830**	219.3
227.1	**60**	15.9	1703.3	**450**	118.9	3179.4	**840**	221.9
265.0	**70**	18.5	1741.1	**460**	121.5	3217.3	**850**	224.6
302.8	**80**	21.1	1779.0	**470**	124.2	3255.1	**860**	227.2
340.7	**90**	23.8	1816.8	**480**	126.8	3293.0	**870**	229.9
378.5	**100**	26.4	1854.7	**490**	129.5	3330.8	**880**	232.5
416.4	**110**	29.1	1892.5	**500**	132.1	3368.7	**890**	235.1
454.2	**120**	31.7	1930.4	**510**	134.7	3406.5	**900**	237.8
492.1	**130**	34.3	1968.2	**520**	137.4	3444.4	**910**	240.4
529.9	**140**	37.0	2006.1	**530**	140.0	3482.2	**920**	243.1
567.8	**150**	39.6	2043.9	**540**	142.7	3520.1	**930**	245.7
605.6	**160**	42.3	2081.8	**550**	145.3	3557.9	**940**	248.3
643.5	**170**	44.9	2119.6	**560**	148.0	3595.8	**950**	251.0
681.3	**180**	47.6	2157.5	**570**	150.6	3633.6	**960**	253.6
719.2	**190**	50.2	2195.3	**580**	153.2	3671.5	**970**	256.3
757.0	**200**	52.8	2233.2	**590**	155.9	3709.3	**980**	258.9
794.9	**210**	55.5	2271.0	**600**	158.5	3747.2	**990**	261.6
832.7	**220**	58.1	2308.9	**610**	161.2	3785.0	**1000**	264.2
870.6	**230**	60.8	2346.7	**620**	163.8	4163.5	**1100**	290.6
908.4	**240**	63.4	2384.6	**630**	166.4	4542.0	**1200**	317.0
946.3	**250**	66.1	2422.4	**640**	169.1	4920.5	**1300**	343.5
984.1	**260**	68.7	2460.3	**650**	171.7	5299.0	**1400**	369.9
1022.0	**270**	71.3	2498.1	**660**	174.4	5677.5	**1500**	396.3
1059.8	**280**	74.0	2536.0	**670**	177.0	6056.0	**1600**	422.7
1097.7	**290**	76.6	2573.8	**680**	179.7	6434.5	**1700**	449.1
1135.5	**300**	79.3	2611.7	**690**	182.3	6813.0	**1800**	475.6
1173.4	**310**	81.9	2649.5	**700**	184.9	7191.5	**1900**	502.0
1211.2	**320**	84.5	2687.4	**710**	187.6	7570.0	**2000**	528.4
1249.1	**330**	87.2	2725.2	**720**	190.2	7948.5	**2100**	554.8
1286.9	**340**	89.8	2763.1	**730**	192.9	8327.0	**2200**	581.2
1324.8	**350**	92.5	2800.9	**740**	195.5	8705.5	**2300**	607.7
1362.6	**360**	95.1	2838.8	**750**	198.2	9084.0	**2400**	634.1
1400.5	**370**	97.8	2876.6	**760**	200.8	9462.5	**2500**	660.5
1438.3	**380**	100.4	2914.5	**770**	203.4	9841.0	**2600**	686.9

Figure 5-4

WEIGHT CONVERSIONS

EFFECTIVITY

All

- To convert from kilograms to pounds, find, in the bold face columns, the number of kilograms to be converted. The equivalent number of pounds is read in the adjacent column headed POUNDS.
- To convert from pounds to kilograms, find, in the bold face columns, the number of pounds to be converted. The equivalent number of kilograms is read in the adjacent column headed KILOGRAMS.

KILOGRAMS ◄►		POUNDS	KILOGRAMS ◄►		POUNDS	KILOGRAMS ◄►		POUNDS
4.5	**10**	22.0	208.7	**460**	1014.1	412.8	**910**	2006.2
9.1	**20**	44.1	213.2	**470**	1036.2	417.3	**920**	2028.2
13.6	**30**	66.1	217.7	**480**	1058.2	421.8	**930**	2050.3
18.1	**40**	88.2	222.3	**490**	1080.3	426.4	**940**	2072.3
22.7	**50**	110.2	226.8	**500**	1102.3	430.9	**950**	2094.4
27.2	**60**	132.3	231.3	**510**	1124.3	435.5	**960**	2116.4
31.8	**70**	154.3	235.9	**520**	1146.4	440.0	**970**	2138.5
36.3	**80**	176.4	240.4	**530**	1168.4	444.5	**980**	2160.5
40.8	**90**	198.4	244.9	**540**	1190.5	449.1	**990**	2182.6
45.4	**100**	220.5	249.5	**550**	1212.5	453.6	**1000**	2204.6
49.9	**110**	242.5	254.0	**560**	1234.6	499.0	**1100**	2425.1
54.4	**120**	264.6	258.6	**570**	1256.6	544.3	**1200**	2645.5
59.0	**130**	286.6	263.1	**580**	1278.7	589.7	**1300**	2866.0
63.5	**140**	308.6	267.6	**590**	1300.7	635.0	**1400**	3086.4
68.0	**150**	330.7	272.2	**600**	1322.8	680.4	**1500**	3306.9
72.6	**160**	352.7	276.7	**610**	1344.8	907.2	**2000**	4409.2
77.1	**170**	374.8	281.2	**620**	1366.9	1134.0	**2500**	5511.5
81.6	**180**	396.8	285.8	**630**	1388.9	1360.8	**3000**	6613.8
86.2	**190**	418.9	290.3	**640**	1410.9	1587.6	**3500**	7716.1
90.7	**200**	440.9	294.8	**650**	1433.0	1814.4	**4000**	8818.4
95.3	**210**	463.0	299.4	**660**	1455.0	2041.2	**4500**	9920.7
99.8	**220**	485.0	303.9	**670**	1477.1	2268.0	**5000**	11023.0
104.3	**230**	507.1	308.4	**680**	1499.1	2494.8	**5500**	12125.3
108.9	**240**	529.1	313.0	**690**	1521.2	2721.6	**6000**	13227.6
113.4	**250**	551.1	317.5	**700**	1543.2	2948.4	**6500**	14329.9
117.9	**260**	573.2	322.1	**710**	1565.3	3175.2	**7000**	15432.2
122.5	**270**	595.2	326.6	**720**	1587.3	3402.0	**7500**	16534.5
127.0	**280**	617.3	331.1	**730**	1609.4	3628.8	**8000**	17636.8
131.5	**290**	639.3	335.7	**740**	1631.4	3855.6	**8500**	18739.1
136.1	**300**	661.4	340.2	**750**	1653.4	4082.4	**9000**	19841.4
140.6	**310**	683.4	344.7	**760**	1675.5	4309.2	**9500**	20943.7
145.2	**320**	705.5	349.3	**770**	1697.5	4536.0	**10000**	22046.0
149.7	**330**	727.5	353.8	**780**	1719.6	4989.6	**11000**	24250.6
154.2	**340**	749.6	358.3	**790**	1741.6	5443.2	**12000**	26455.2
158.8	**350**	771.6	362.9	**800**	1763.7	5896.8	**13000**	28659.8
163.3	**360**	793.7	367.4	**810**	1785.7	6350.4	**14000**	30864.4
167.8	**370**	815.7	371.9	**820**	1807.8	6804.0	**15000**	33069.0
172.4	**380**	837.7	376.5	**830**	1829.8	7257.6	**16000**	35273.6
176.9	**390**	859.8	381.0	**840**	1851.9	7711.1	**17000**	37478.2
181.4	**400**	881.8	385.6	**850**	1873.9	8164.7	**18000**	39682.8
186.0	**410**	903.9	390.1	**860**	1896.0	8618.3	**19000**	41887.4
190.5	**420**	925.9	394.6	**870**	1918.0	9071.9	**20000**	44092.0
195.0	**430**	948.0	399.2	**880**	1940.0	9525.5	**21000**	46296.6
199.6	**440**	970.0	403.7	**890**	1962.1	9979.1	**22000**	48501.2
204.1	**450**	992.1	408.2	**900**	1984.1	10432.7	**23000**	50705.8

Figure 5-5

AIRSPEED CALIBRATION — PRIMARY SYSTEM
FLAPS — UP/GEAR — UP

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 220 KIAS
2. Altitude ..... 20000 FT
3. Calibrated Airspeed ..... 218 KCAS
° Position Correction..... (minus) -2 Knots

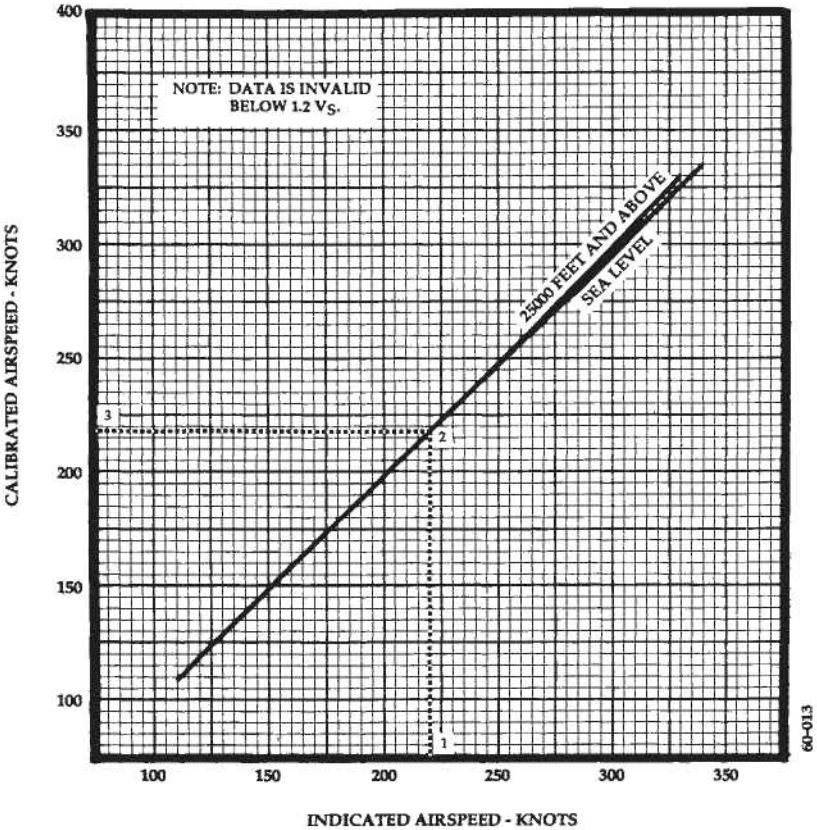


Figure 5-6

AIRSPEED CALIBRATION — PRIMARY SYSTEM
FLAPS — 8°, 20°, or DN/GEAR — UP or DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 200 KIAS
2. Calibrated Airspeed ..... 198 KCAS
° Position Correction..... (minus) -2 Knots

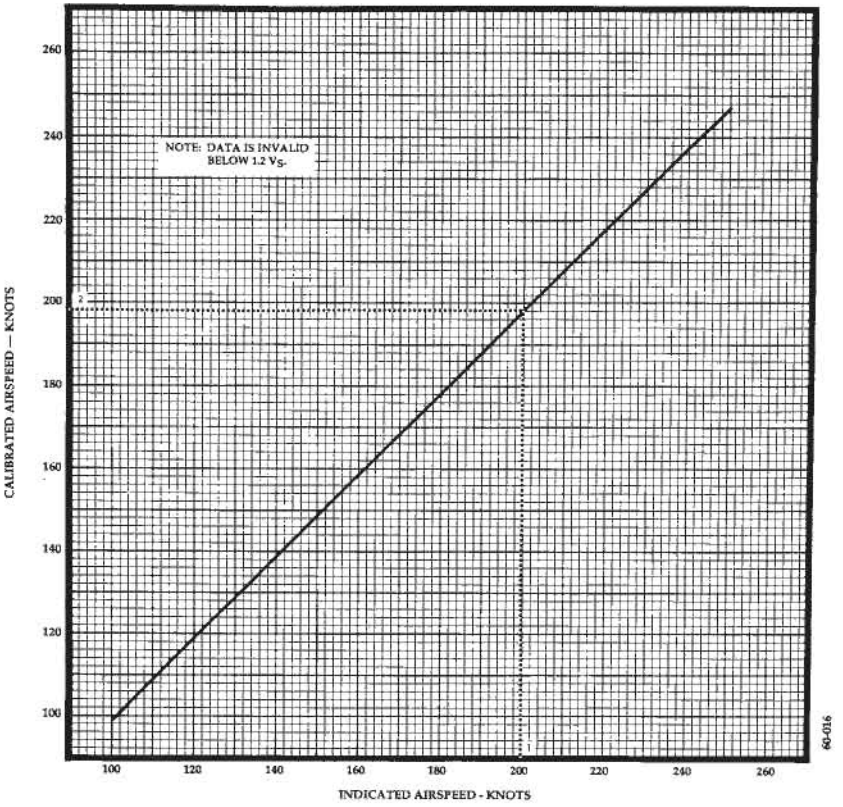


Figure 5-7

AIRSPEED CALIBRATION — STANDBY SYSTEM
FLAPS — UP/GEAR — UP

EFFECTIVITY
Aircraft 60-001 thru 60-248

EXAMPLE:

1. Indicated Airspeed..... 200 KIAS
2. Altitude ..... 20,000 FT
3. Calibrated Airspeed.....200 KCAS
   - Position Correction..... 0 Knots

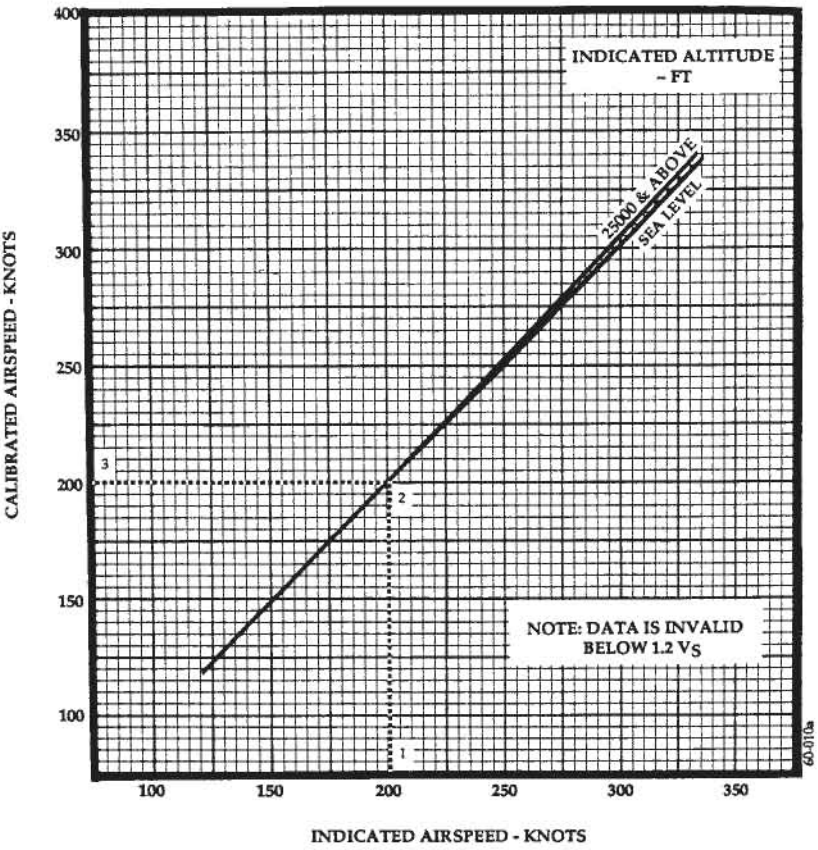


Figure 5-8

AIRSPEED CALIBRATION — STANDBY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-249 & Subsequent

EXAMPLE:

1. Indicated Airspeed..... 275 KIAS
2. Calibrated Airspeed.....276 KCAS

◦ Position Correction.....1 Knot

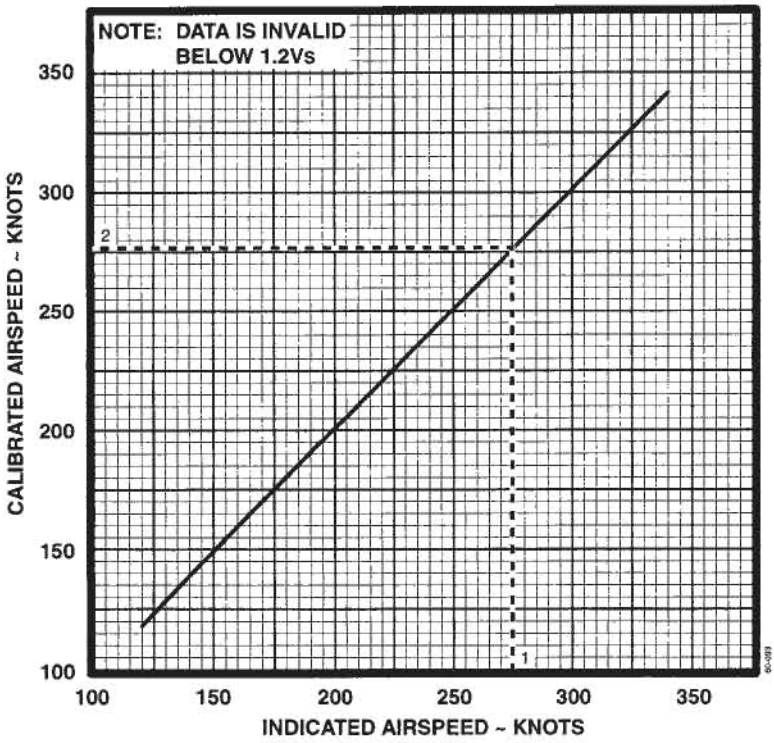


Figure 5-8.1

AIRSPEED CALIBRATION — STANDBY SYSTEM
FLAPS — 8°, 20°, or DN/GEAR — UP or DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 200 KIAS
2. Calibrated Airspeed ..... 201 KCAS
° Position Correction ..... 1 Knot

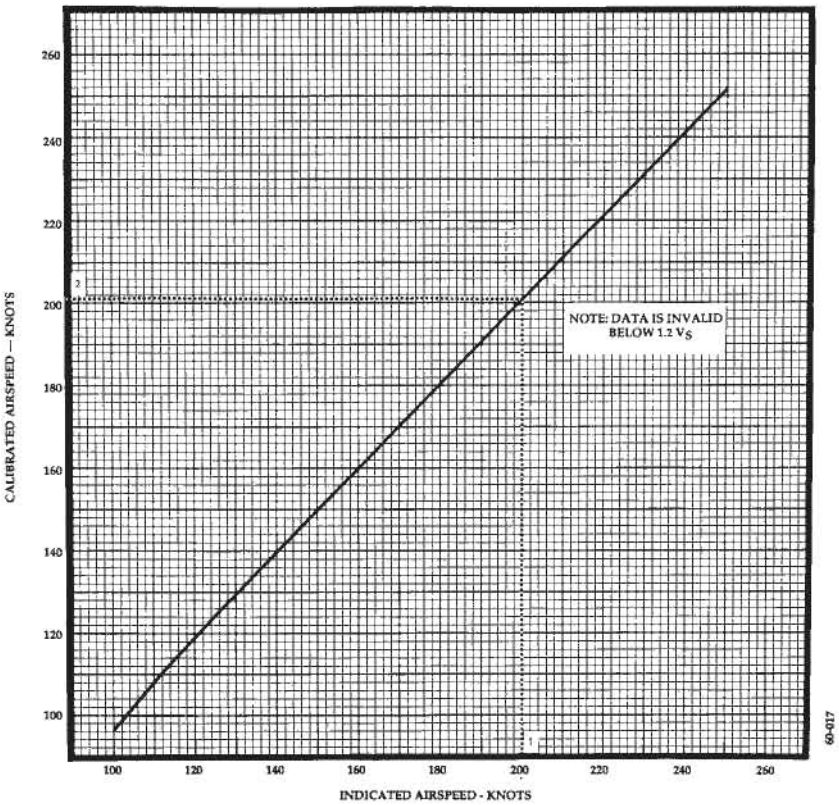


Figure 5-9

GROUND AIRSPEED CALIBRATION — PRIMARY SYSTEM
FLAPS — 8° or 20/GEAR — DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 110.0 KIAS
2. Calibrated Airspeed ..... 110.5 KCAS
° Position Correction..... (plus) .5 Knot

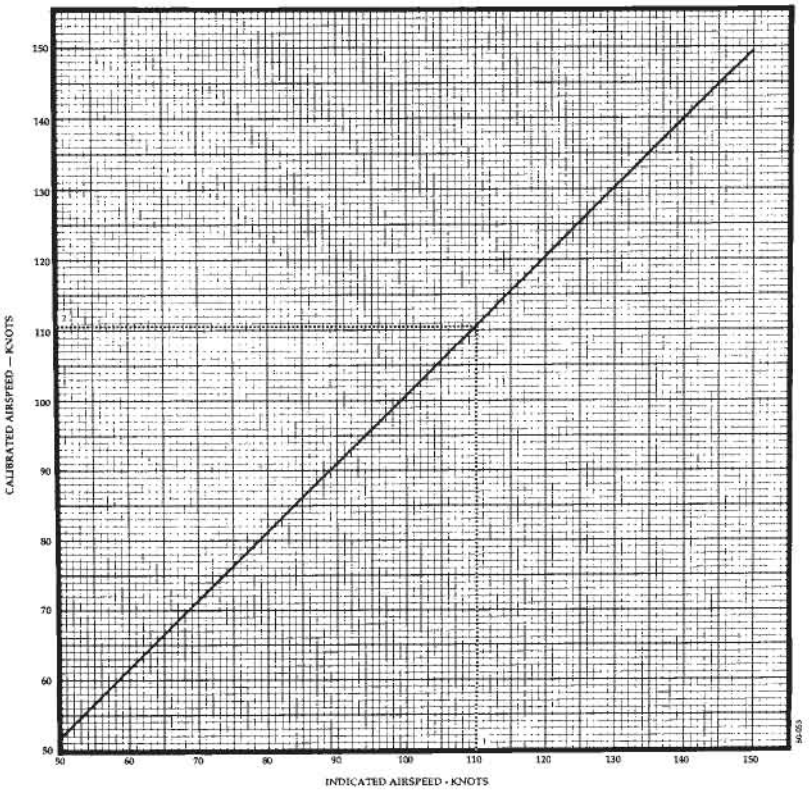


Figure 5-10

MACH CALIBRATION — PRIMARY SYSTEM
FLAPS — UP, GEAR — UP

EFFECTIVITY
All

EXAMPLE:
1. Indicated Mach No. ..... 0.610M_I
2. Altitude .....20000 FT
3. Calibrated Mach No..... 0.604M_C
° Position Correction..... (minus) -.006

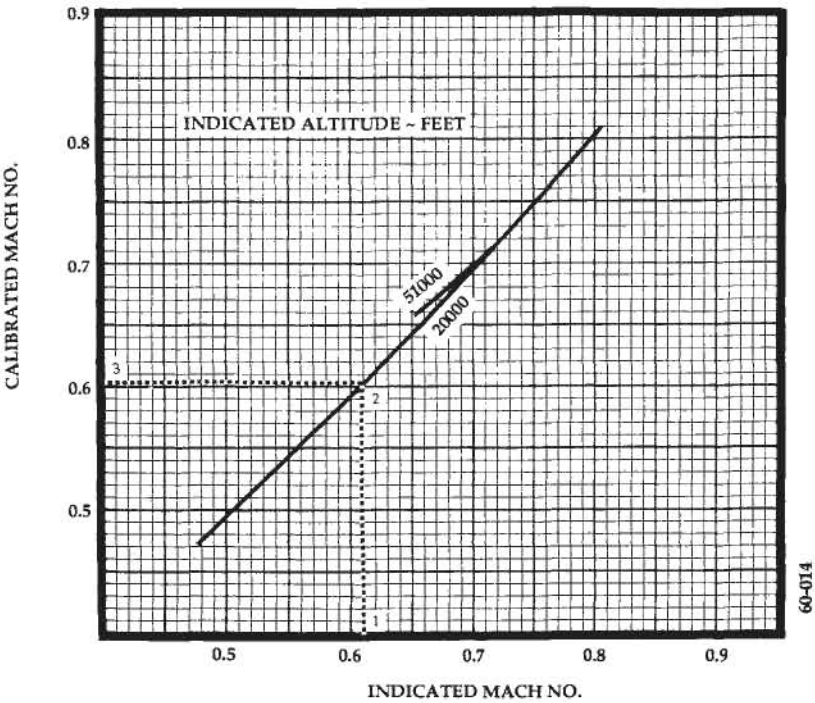


Figure 5-11

MACH CALIBRATION — STANDBY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-001 thru 60-248

EXAMPLE:

1. Indicated Mach No. . . . . 0.75 MI
2. Altitude . . . . . 43,000 FT
3. Calibrated Mach No. . . . . 0.77 MC
   - Position Correction 0.02

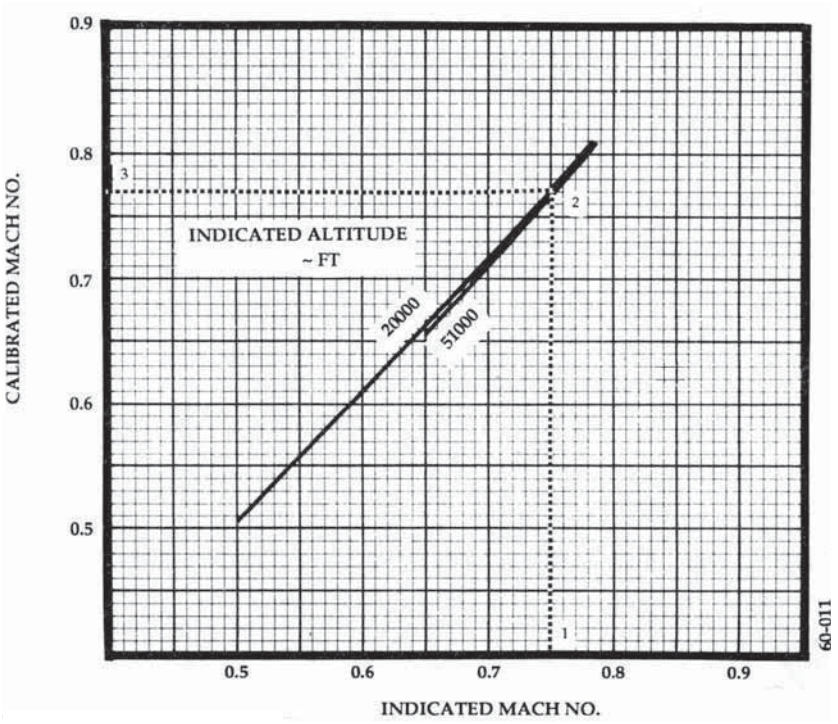


Figure 5-12

MACH CALIBRATION — STANDBY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-249 & Subsequent

EXAMPLE:

1. Indicated Mach No. . . . . 0.75 MI
2. Calibrated Mach No. . . . . .0.75 MC
   - Position Correction. 0.00

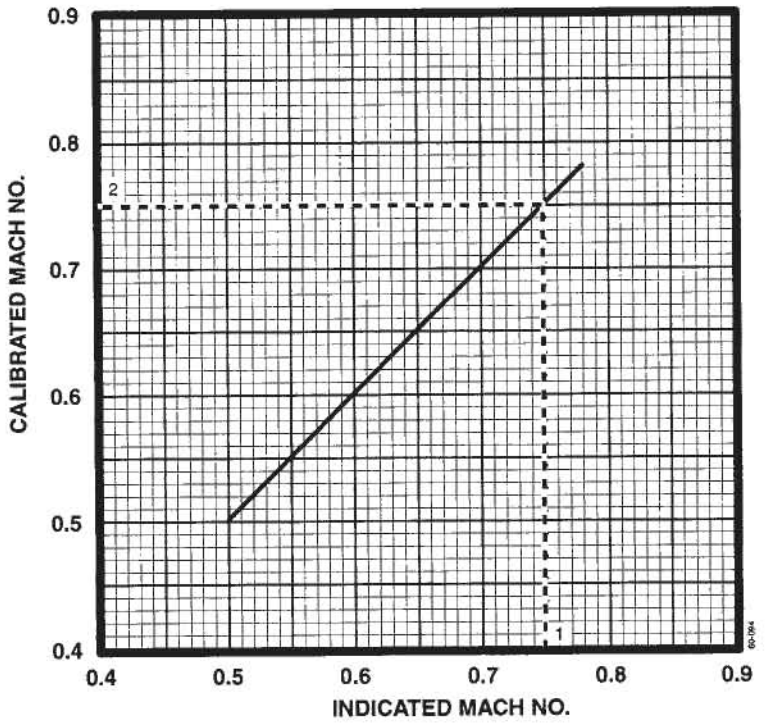


Figure 5-12.1

ALTITUDE POSITION CORRECTION — PRIMARY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-001 thru 60-113

EXAMPLE:

1. Indicated Airspeed.....300 KIAS
2. Indicated Altitude .....30,000 FT
3. Position Correction .....(plus) 15 FT

◦ Actual Altitude.....30,015 FT

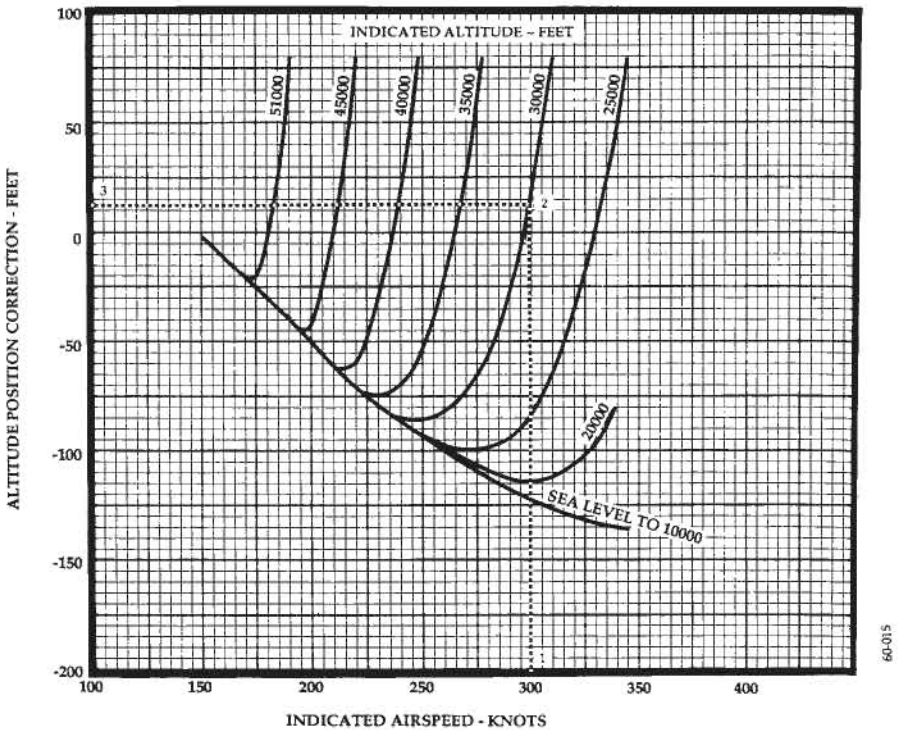


Figure 5-13

ALTITUDE POSITION CORRECTION — PRIMARY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-114 & Subsequent

EXAMPLE:

1. Indicated Airspeed. . . . . 250 KIAS
2. Indicated Altitude . . . . . 25,000 FT
3. Position Correction . . . . . (plus) 11 FT

◦ Actual Altitude. . . . . 25,011 FT

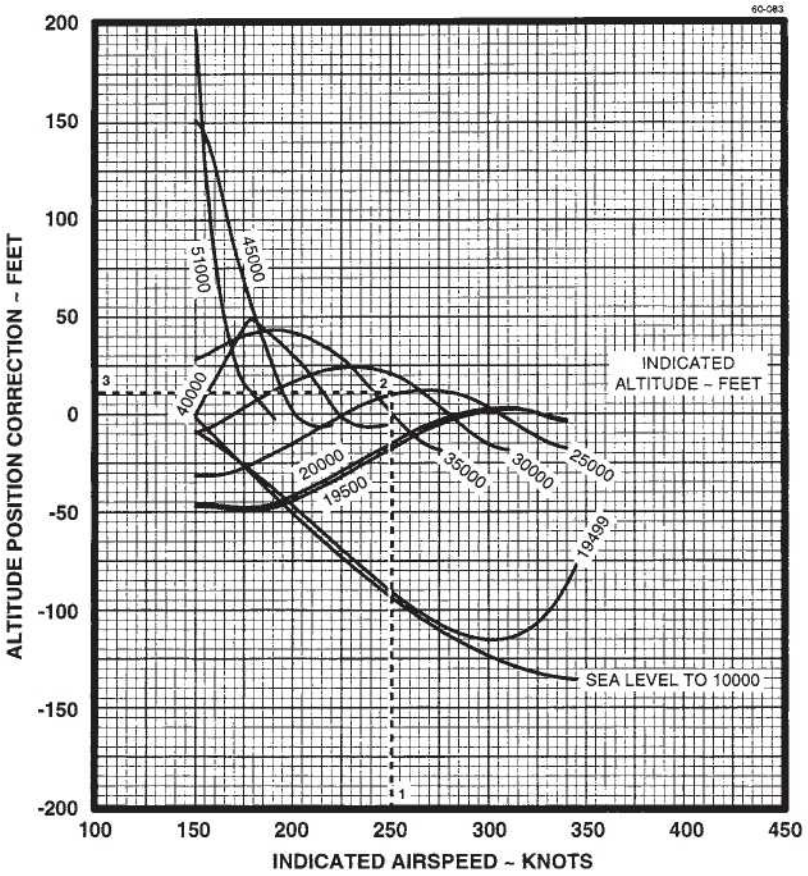


Figure 5-13.1

ALTITUDE POSITION CORRECTION — PRIMARY SYSTEM
FLAPS — 8°/GEAR — UP or DOWN

EFFECTIVITY
All

EXAMPLE:

1. Indicated Airspeed ..... 220 KIAS
2. Indicated Altitude.....5000 FT
3. Position Correction ..... (minus) -45 FT
° Actual Altitude ..... 4955 FT

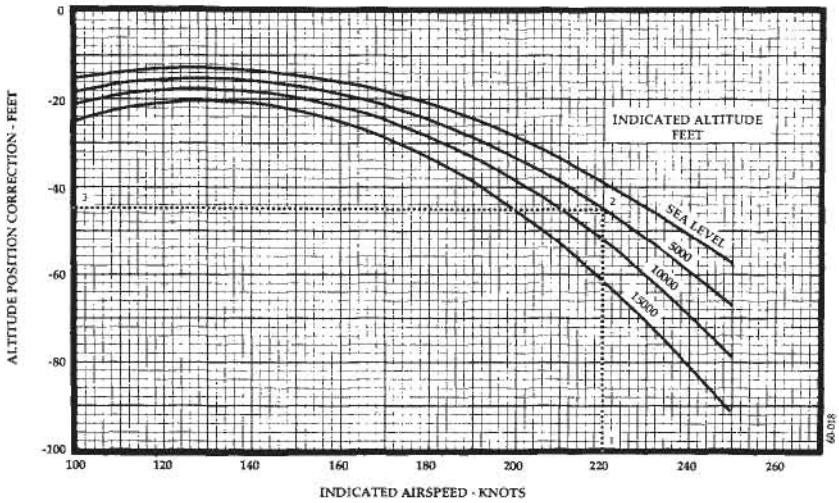


Figure 5-14

ALTITUDE POSITION CORRECTION — PRIMARY SYSTEM
FLAPS — 20°/GEAR — UP or DOWN

EFFECTIVITY
All

EXAMPLE:

1. Indicated Airspeed ..... 170 KIAS
2. Indicated Altitude.....15000 FT
3. Position Correction ..... (minus) -29 FT
° Actual Altitude ..... 14971 FT

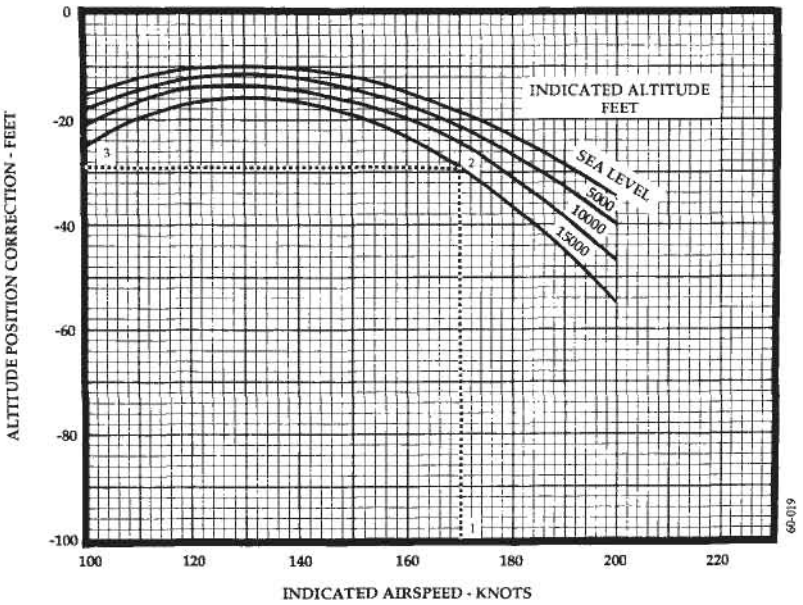


Figure 5-15

ALTITUDE POSITION CORRECTION — PRIMARY SYSTEM
FLAPS — DN (40°)/GEAR — DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 150 KIAS
2. Indicated Altitude.....10000 FT
3. Position Correction ..... (minus) -22 FT
° Actual Altitude ..... 9978 FT

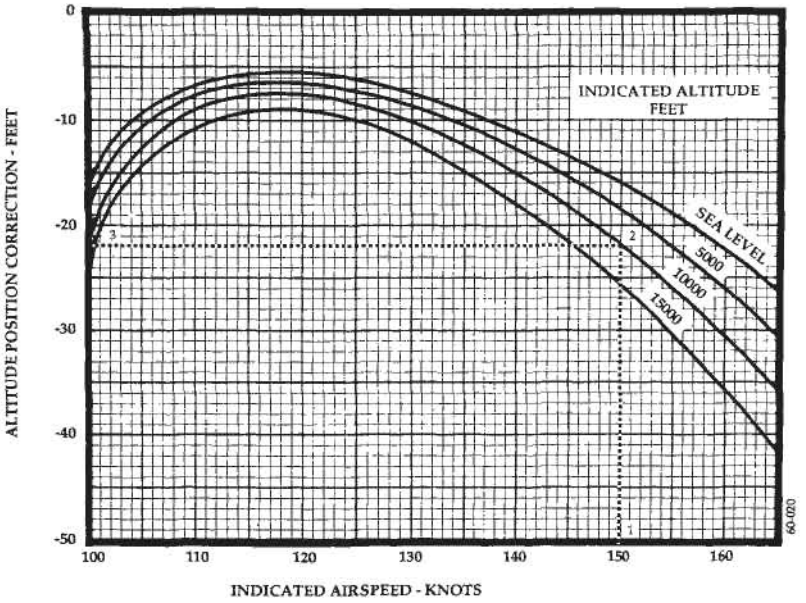


Figure 5-16

ALTITUDE POSITION CORRECTION — STANDBY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-001 thru 60-248

EXAMPLE:

1. Indicated Airspeed..... 225 KIAS
2. Indicated Altitude ..... 40,000 FT
3. Position Correction..... (plus) 350 FT

◦ Actual Altitude..... 40,350 FT

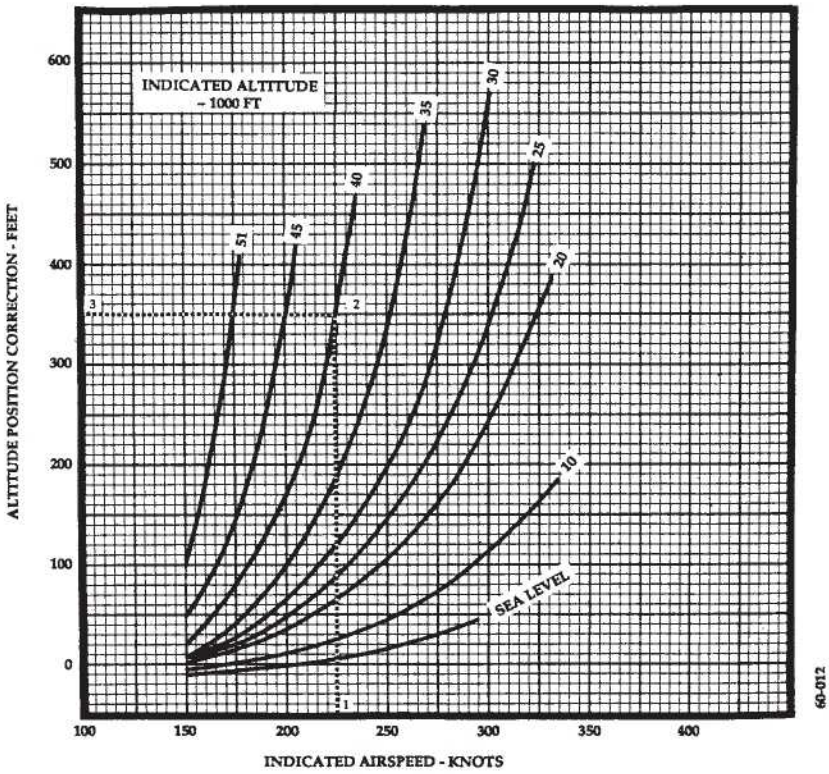


Figure 5-17

ALTITUDE POSITION CORRECTION — STANDBY SYSTEM

FLAPS — UP/GEAR — UP

EFFECTIVITY

Aircraft 60-249 & Subsequent

EXAMPLE:

1. Indicated Airspeed ..... 220 KIAS
2. Indicated Altitude ..... 40,000 FT
3. Position Correction ..... (plus) 11 FT
   - Actual Altitude ..... 40,011 FT

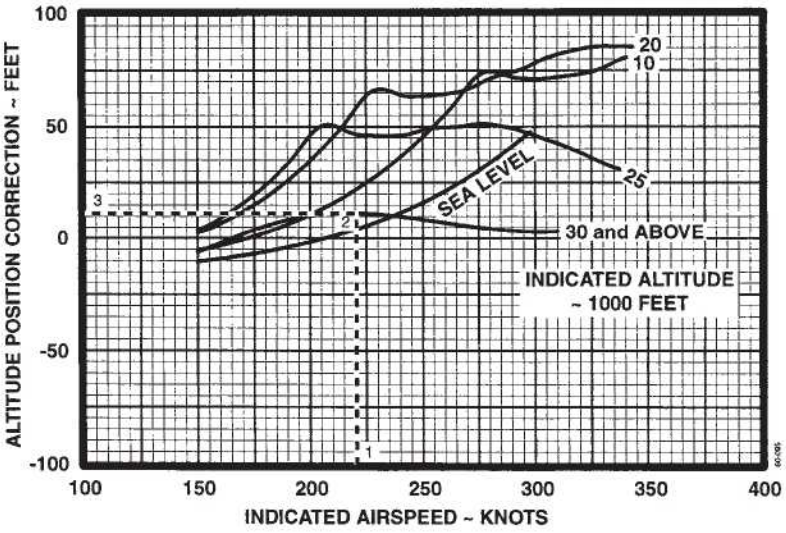


Figure 5-17.1

ALTITUDE POSITION CORRECTION — STANDBY SYSTEM
FLAPS — 8°/GEAR — UP or DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 130 KIAS
2. Indicated Altitude ..... 10,000 FT
3. Position Correction ..... (minus) -38 FT
° Actual Altitude ..... 9962 FT

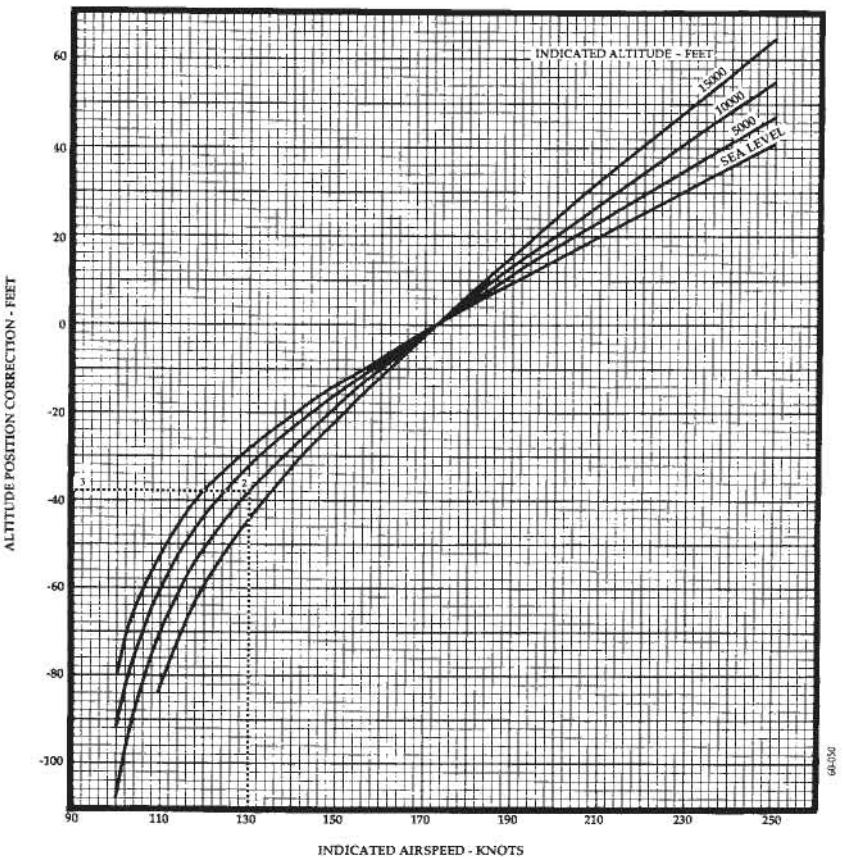


Figure 5-18

ALTITUDE POSITION CORRECTION — STANDBY SYSTEM
FLAPS — 20°/GEAR — UP or DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 190 KIAS
2. Indicated Altitude.....15000 FT
3. Position Correction ..... (plus) 18 FT
° Actual Altitude ..... 15018 FT

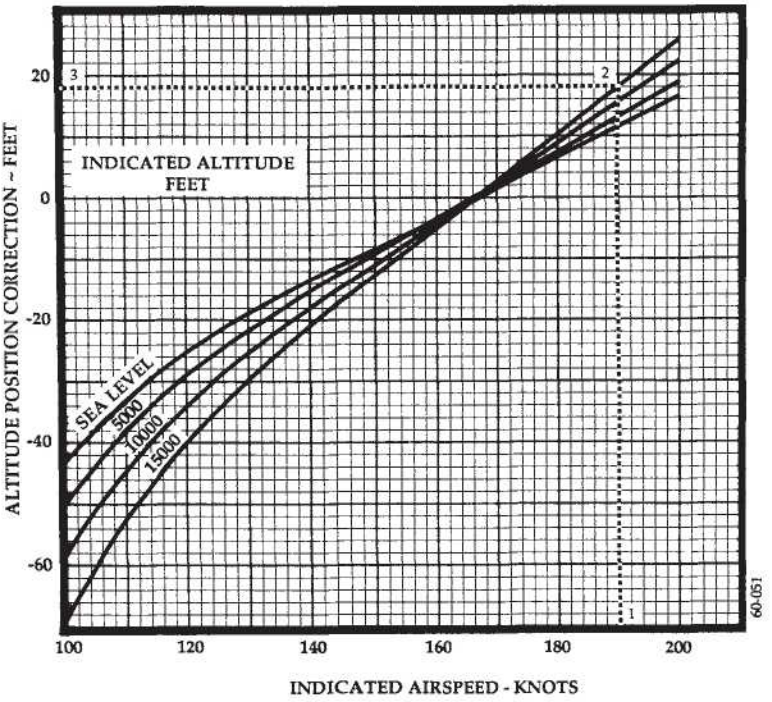


Figure 5-19

ALTITUDE POSITION CORRECTION — STANDBY SYSTEM
FLAPS — DN (40°)/GEAR — DOWN

EFFECTIVITY
All

EXAMPLE:
1. Indicated Airspeed ..... 110 KIAS
2. Indicated Altitude.....5000 FT
3. Position Correction ..... (minus) -22 FT
° Actual Altitude ..... 4978 FT

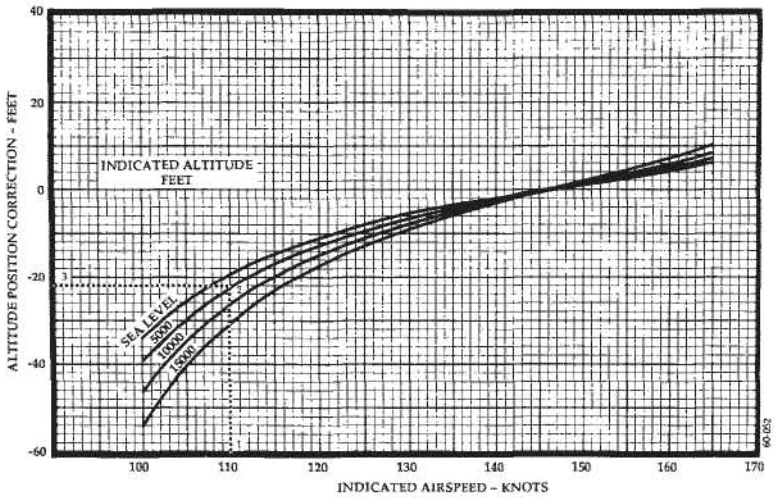
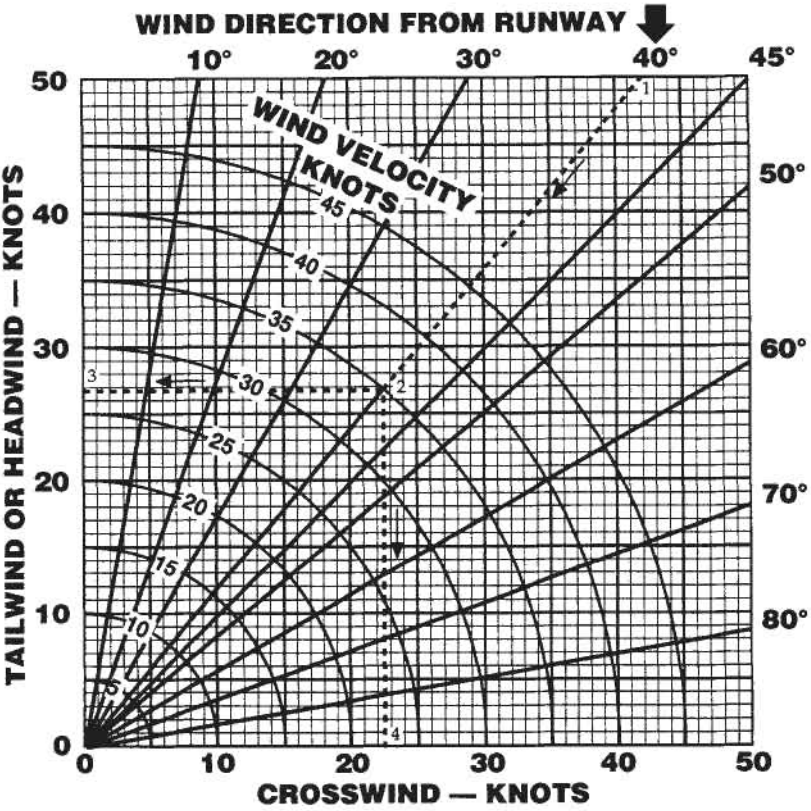


Figure 5-20

WIND COMPONENTS

EFFECTIVITY
All



CONDITIONS:

- Wind Velocity ..... 35 Knots
- Wind Direction ..... 300°
- Runway Heading ..... 340°

EXAMPLE:

1. Wind Direction from Runway (See Note) ..... 40°
2. Wind Velocity ..... 35 Knots
3. Headwind Component ..... 26.7 Knots
4. Crosswind Component ..... 22.5 Knots

NOTE: To calculate wind direction from runway, subtract wind direction from runway heading. Enter the chart at the absolute value of wind direction from runway.

Figure 5-21

STALL SPEEDS
GEAR UP or DOWN
THRUST — IDLE

EFFECTIVITY
All

EXAMPLE:

1. Weight ..... 18,500 Lb (8,391 Kg)
2. Flap Setting ..... 20°
3. Altitude Reference Line
4. Altitude ..... 2,000 FT
5. Stall Speed ..... 110 KCAS

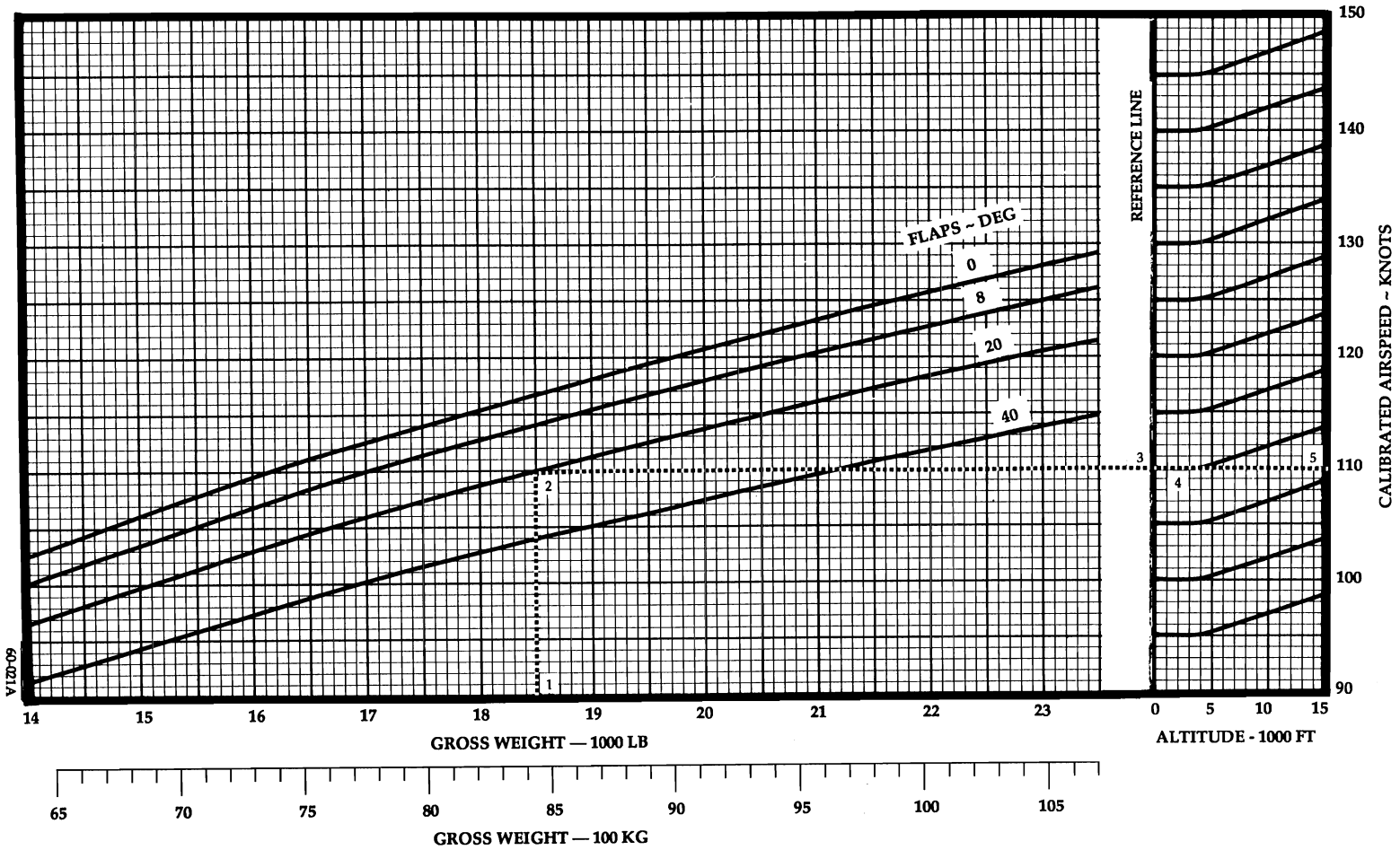


Figure 5-22

STALL SPEEDS — TURNING FLIGHT

GEAR UP or DOWN

THRUST — IDLE

EFFECTIVITY
All

EXAMPLE:

1. Bank Angle. . . . . 40°
2. Weight. . . . . 18,000 Lb (8,165 Kg)
3. Flap Setting . . . . . 20°
4. Altitude Reference Line
5. Altitude . . . . . 8,000 FT
6. Stall Speed . . . . . 126 KCAS

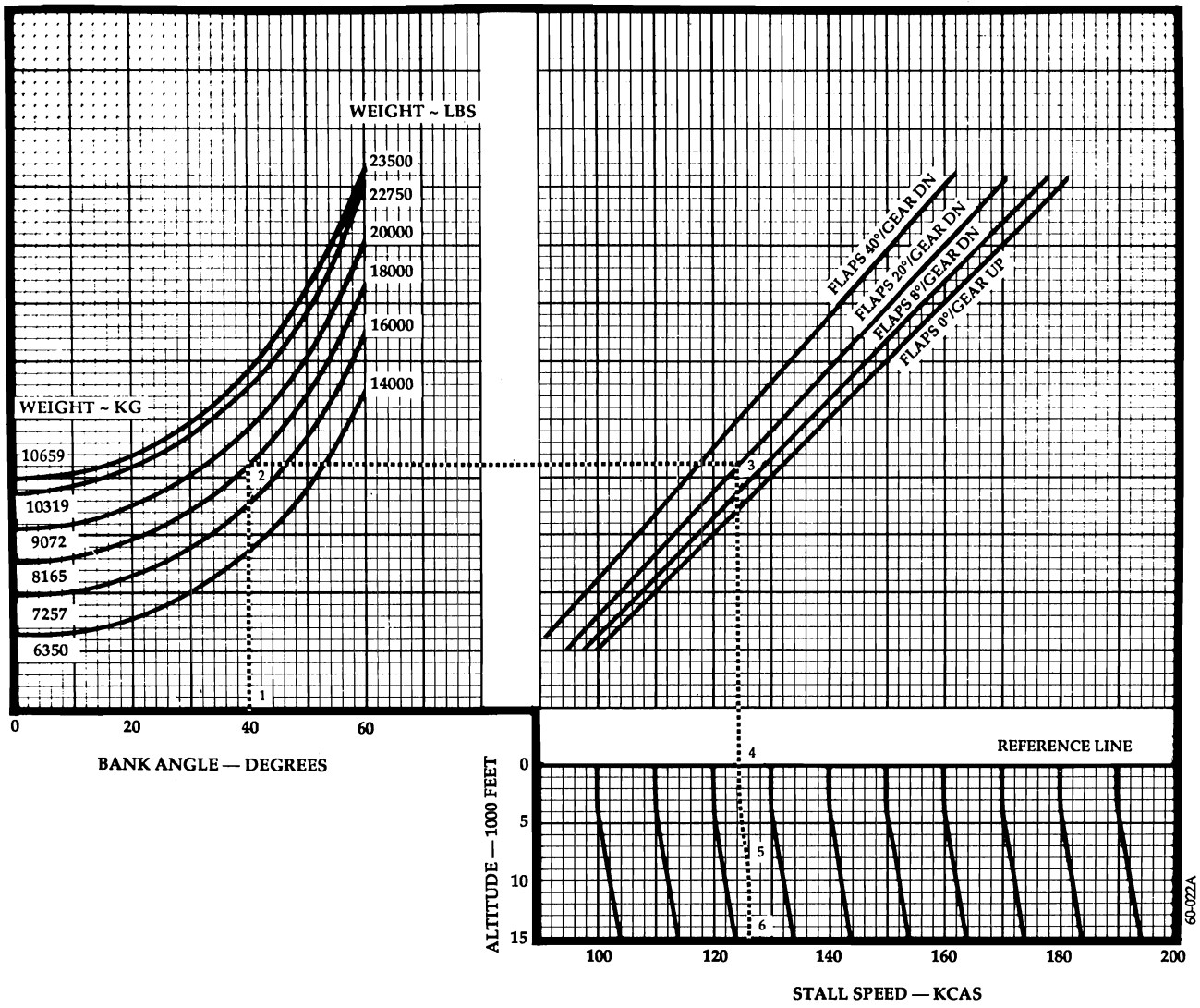


Figure 5-23

BUFFET BOUNDARY
FORWARD C.G.

EFFECTIVITY
All

EXAMPLE:

1. Indicated Mach .....0.70 MI
2. Altitude.....40,000 FT
3. Weight..... 18,000 Lb (8,165 Kg)
4. For 1 "G" Flight
5. High Speed Buffet MI = Above MMO
6. Low Speed Buffet MI = 0.57
   Indicated Airspeed = 165
7. For Maneuvering Flight
   Bank Angle = 50°
   Load Factor = 1.56 G

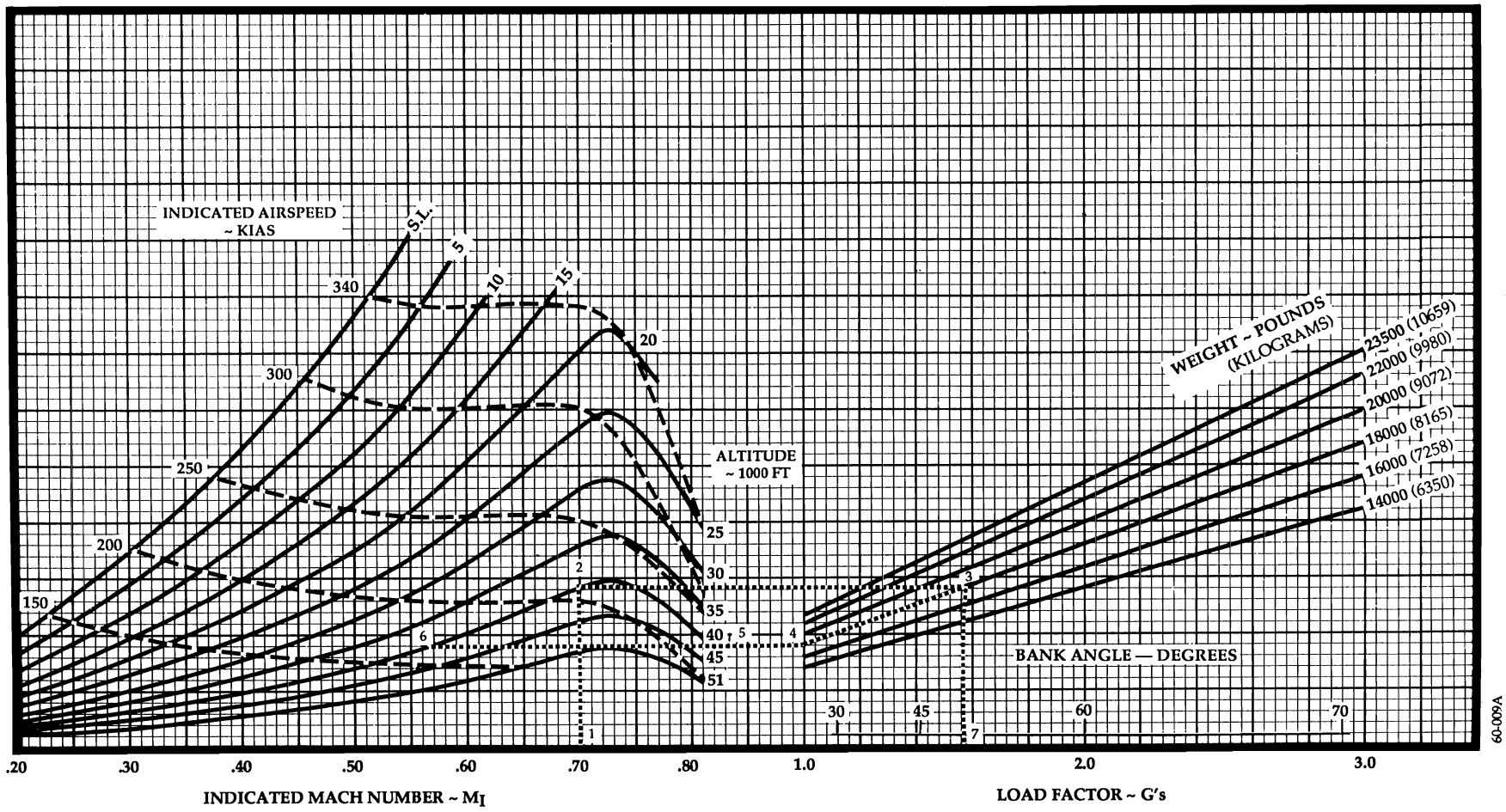


Figure 5-24

THRUST SETTING PROCEDURE

TAKEOFF

Move thrust lever to the Takeoff (T/O) position. Operation at a specific N1 should always be within the ITT Limits. ITT Limit must be observed.

The FADEC will determine the proper takeoff N1 and position the N1 bug to that value. The left and right N1 bugs should agree within 1%. The N1 needle should align with the N1 bug when the thrust lever is placed in the T/O position. If left and right N1 bugs do not agree within 1%, refer to the applicable Takeoff Thrust Setting chart for the proper thrust setting. If a white ENG CMPTR light is illuminated, refer to WHITE ENG CMPTR LIGHT ILLUMINATED procedure, Section IV.

Chart N1 is the value where the temperature line intersects the pressure altitude line. N1's above this line may exceed the airframe and engine limits. N1's below this line will not meet the performance in this section.

MAXIMUM CLIMB

Move thrust lever to the Maximum Continuous Thrust (MCT) position. Operation at a specific N1 should always be within the ITT Limits. ITT Limit must be observed.

When airborne with the flaps up, the FADEC will determine the proper maximum continuous thrust N1 and position the N1 bug to that value. When airborne with the flaps up, the N1 needle should align with the N1 bug when the thrust lever is placed in the MCT position.

TAKEOFF THRUST SETTING
ANTI-ICE — OFF

EFFECTIVITY
All

EXAMPLE:
1. Temperature ..... 65° F (18° C)
2. Altitude ..... 2000 Feet
3. Takeoff Thrust Setting 95.2% N1

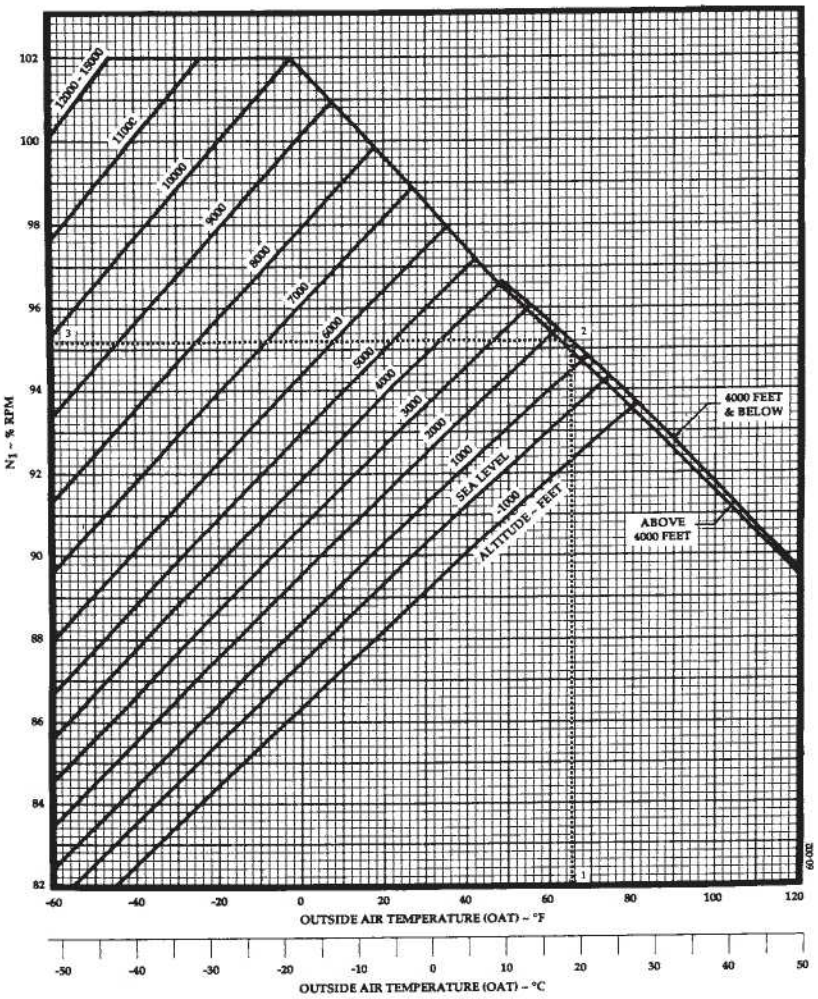


Figure 5-25

TAKEOFF THRUST SETTING
ANTI-ICE — ON

EFFECTIVITY
All

EXAMPLE:

1. Temperature ..... -10° F (-23° C)
2. Altitude ..... 4,000 FT
3. Takeoff Thrust Setting 90.8% N1

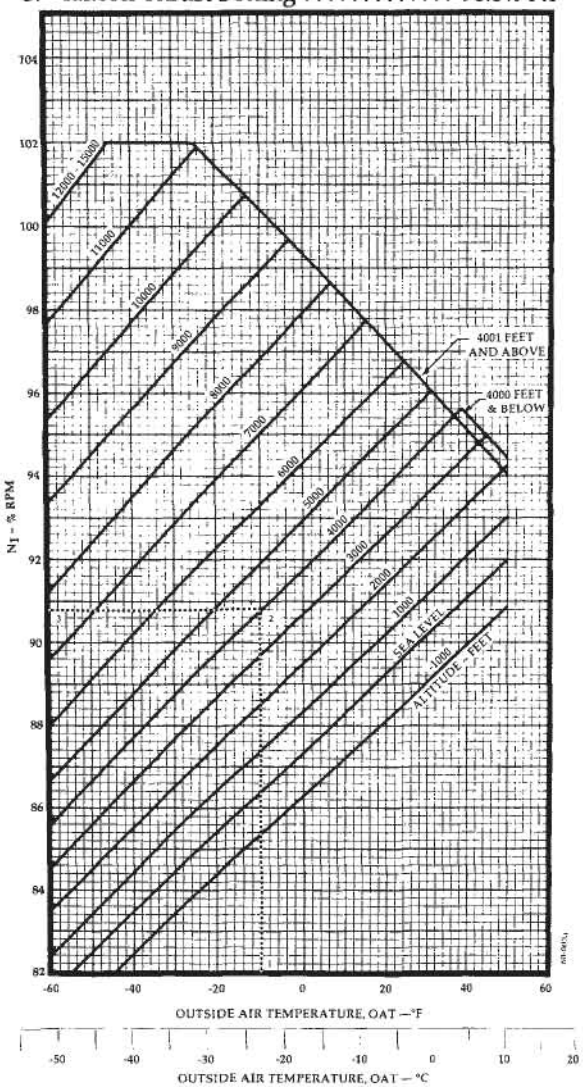


Figure 5-26

TAKEOFF THRUST SETTING
NAC HT — ONLY

EFFECTIVITY
All

EXAMPLE:

1. Temperature ..... -28° F (-33° C)
2. Altitude ..... 5,000 FT
3. Takeoff Thrust Setting 90.0% N1

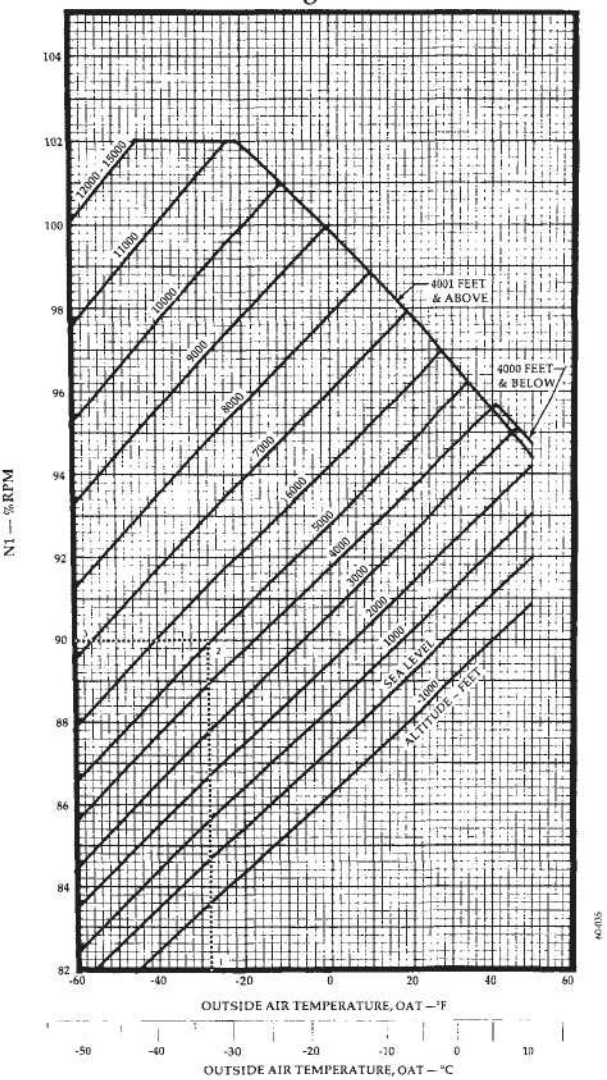


Figure 5-26A

APR THRUST SETTING
ANTI-ICE — OFF

EFFECTIVITY
All

EXAMPLE:
1. Temperature ..... 70° F (21° C)
2. Altitude ..... 3000 Feet
3. APR Thrust Setting 97.0% N1

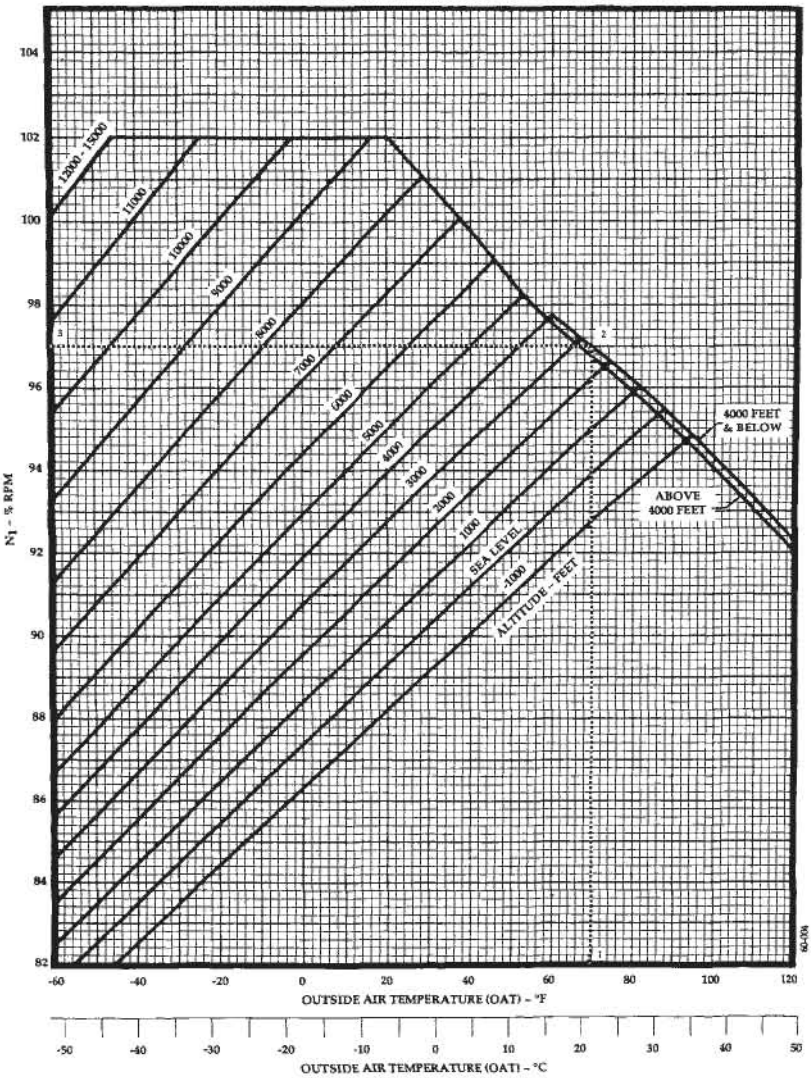


Figure 5-27

APR THRUST SETTING
ANTI-ICE — ON

EFFECTIVITY
All

EXAMPLE:

1. Temperature ..... 10° F (-12° C)
2. Altitude ..... 1,000 FT
3. APR Thrust Setting 89.4% N1

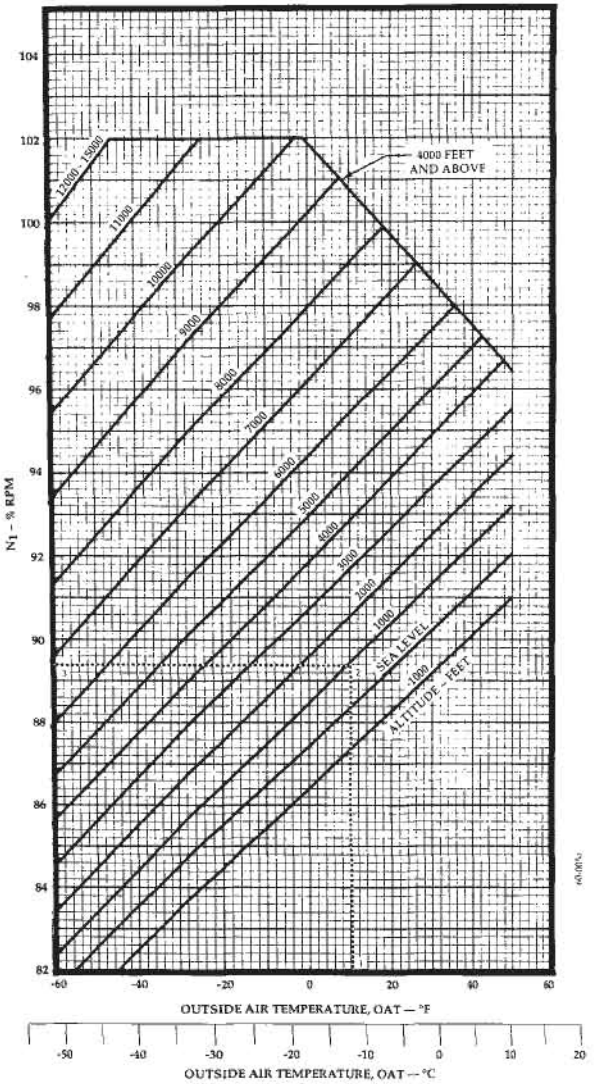


Figure 5-28

APR THRUST SETTING
NAC HT — ONLY

EFFECTIVITY
All

EXAMPLE:

1. Temperature ..... 2° F (-17° C)
2. Altitude ..... 2,000 FT
3. APR Thrust Setting 89.6% N1

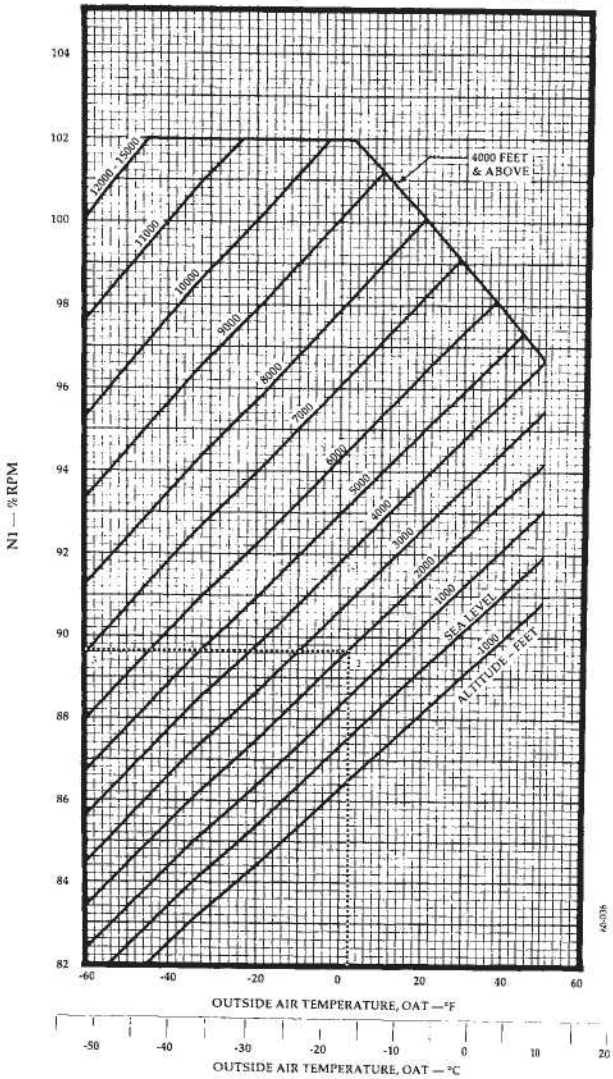


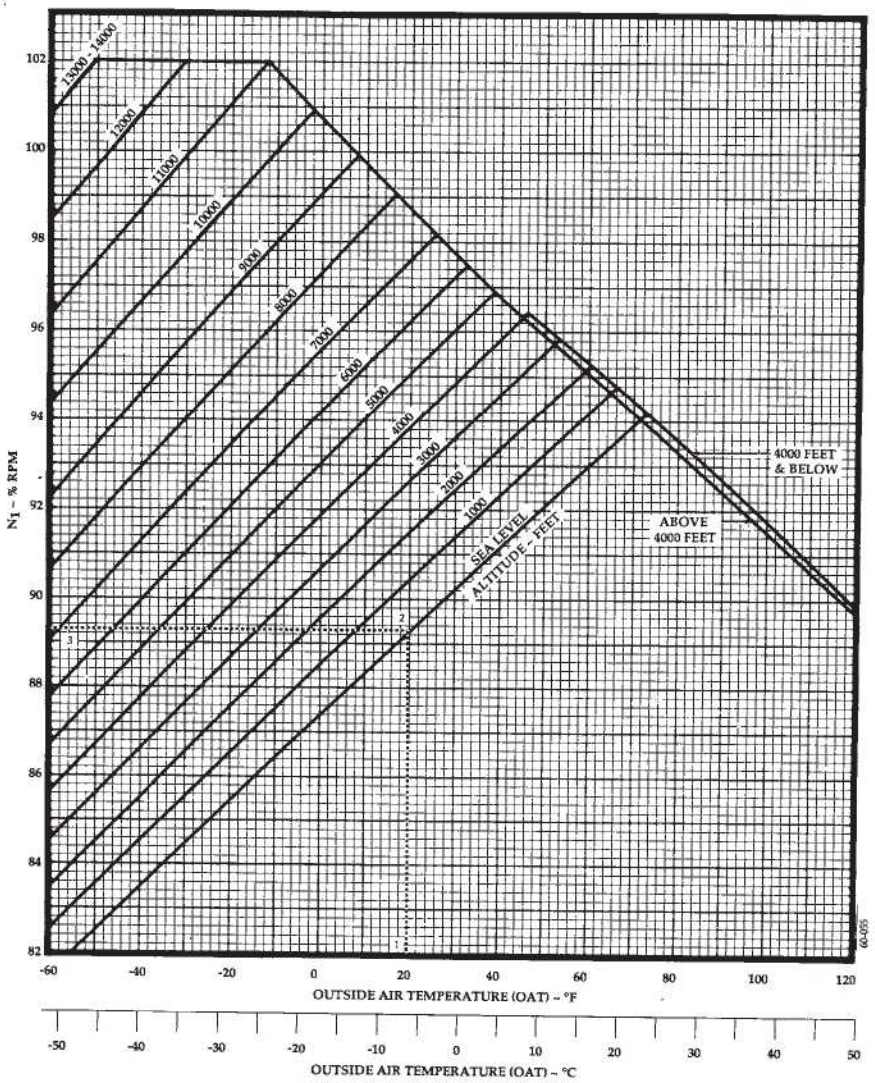
Figure 5-28A

TAKEOFF THRUST SETTING
APPROACH & LANDING CLIMB
ANTI-ICE — OFF

EFFECTIVITY
All

EXAMPLE:

1. Temperature..... 20° F (-6.7° C)
2. Altitude..... Sea Level
3. Takeoff Thrust Setting for Approach and Landing Climb 89.3% N1



TAKEOFF THRUST SETTING
APPROACH & LANDING CLIMB
ANTI-ICE — ON

EFFECTIVITY
All

EXAMPLE:

1. Temperature..... 5° F (-15° C)
2. Altitude..... 4,000 FT
3. Takeoff Thrust Setting for Approach and Landing Climb 92.4% N1

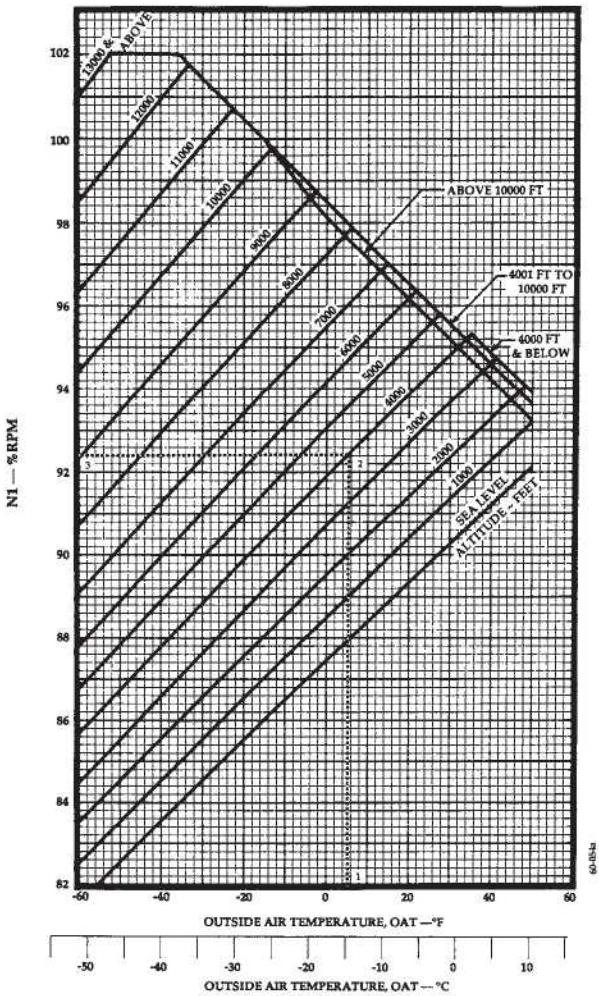


Figure 5-30

TAKEOFF THRUST SETTING
APPROACH & LANDING CLIMB
NAC HT — ONLY

EFFECTIVITY
All

EXAMPLE:

1. Temperature..... -30° F (-34° C)
2. Altitude..... 6,000 FT
3. Takeoff Thrust Setting for Approach and Landing Climb 91.0% N1

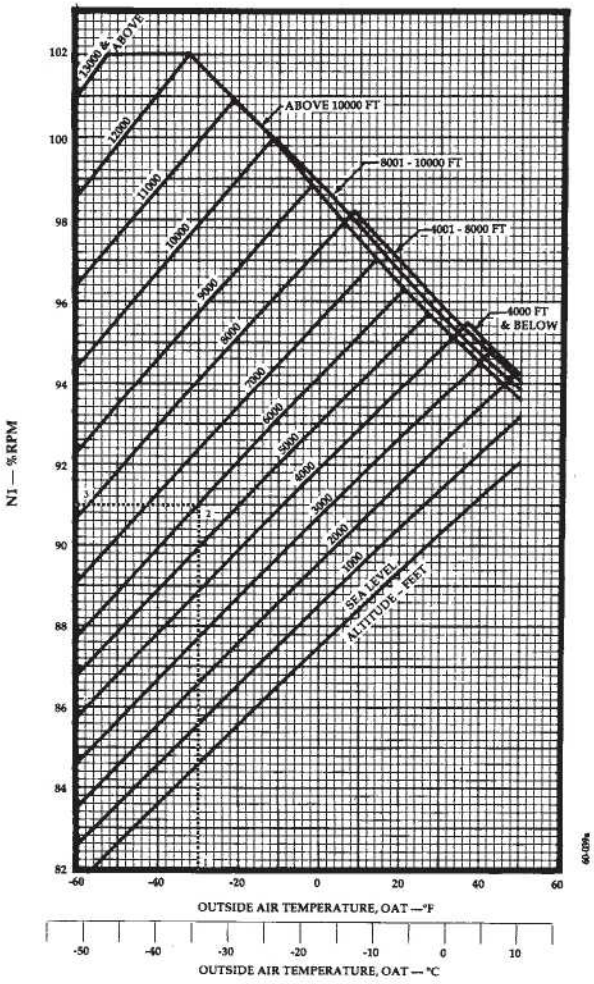


Figure 5-30A

EFFECTIVITY
All

MAXIMUM CONTINUOUS THRUST FOR CLIMB (N1)
ALL ENGINE
ENG SYNC — OFF

NOTE: The N1 values presented are compensated values. If ENG SYNC is on, displayed N1 may be lower than the chart value because of the removal of N1 compensation.

ALTITUDE ~ 1000 FT

	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55
51	97.88	97.66	97.44	97.21	96.85	95.57	94.36	93.74	93.12																	
	94.68	94.42	94.16	93.90	93.50	92.18	90.94	90.28	89.62																	
	93.98	93.72	93.45	93.18	92.77	91.44	90.19	89.52	88.86																	
50	97.88	97.66	97.44	97.22	96.85	95.57	94.37	93.75	93.13																	
	94.71	94.45	94.19	93.94	93.53	92.22	90.97	90.32	89.66																	
	94.02	93.75	93.48	93.22	92.80	91.48	90.23	89.57	88.90																	
45	99.00	98.79	98.57	98.36	98.00	96.72	95.52	94.91	94.29																	
	96.00	95.75	95.50	95.25	94.85	93.54	92.31	91.66	91.01																	
	95.33	95.07	94.81	94.55	94.14	92.83	91.58	90.93	90.27																	
40	100.36	100.86	100.65	100.44	100.08	98.82	97.62	97.01	96.40	95.79																
	98.28	98.04	97.79	97.55	97.16	95.86	94.64	93.99	93.35	92.71																
	97.63	97.38	97.12	96.87	96.48	95.17	93.94	93.29	92.64	91.99																
35	100.36	101.32	101.12	100.92	100.57	99.30	98.11	97.51	96.90	96.30	95.69	95.08														
	99.01	98.77	98.54	98.31	97.93	96.64	95.42	94.78	94.15	93.51	92.88	92.24														
	98.39	98.15	97.90	97.66	97.28	95.98	94.75	94.11	93.47	92.83	92.18	91.54														
30	99.96	101.18	101.44	101.24	101.05	100.03	98.78	98.01	97.41	96.78	96.13	95.48	94.83	94.34												
	99.52	99.29	99.06	98.84	98.61	97.56	96.29	95.49	94.87	94.21	93.53	92.86	92.18	91.67												
	98.95	98.72	98.49	98.25	98.02	96.97	95.68	94.88	94.25	93.59	92.90	92.22	91.54	91.02												
25		100.42	101.62	101.59	101.39	101.10	99.87	98.66	98.07	97.48	96.79	96.09	95.39	94.69	94.20	93.73										
		99.80	99.58	99.36	99.14	98.82	97.57	96.33	95.72	95.11	94.39	93.66	92.94	92.22	91.71	91.22										
		99.30	99.07	98.85	98.62	98.30	97.04	95.80	95.18	94.56	93.84	93.11	92.38	91.65	91.14	90.64										
20			101.00	101.90	101.71	101.52	100.79	99.57	98.64	98.06	97.45	96.76	96.07	95.38	94.71	94.10	93.49	92.96								
			100.08	99.87	99.65	99.44	98.68	97.45	96.49	95.89	95.26	94.54	93.83	93.12	92.43	91.80	91.17	90.62								
			99.65	99.43	99.21	99.00	98.23	96.99	96.03	95.43	94.79	94.07	93.35	92.64	91.94	91.30	90.67	90.12								
15			99.05	100.21	101.35	101.68	101.41	100.21	99.02	98.40	97.82	97.14	96.45	95.75	95.06	94.37	93.67	93.03	92.43	91.80						
			99.05	100.16	99.96	99.75	99.46	98.24	97.02	96.39	95.78	95.09	94.37	93.66	92.95	92.23	91.52	90.86	90.24	89.59						
			99.05	99.80	99.59	99.38	99.09	97.86	96.64	96.00	95.39	94.69	93.97	93.26	92.54	91.82	91.11	90.44	89.82	89.16						
10			90.19	91.24	92.28	93.31	94.32	95.33	96.32	97.31	98.10	97.44	96.73	96.02	95.31	94.60	93.88	93.16	92.49	91.81	91.12	90.42				
			90.19	91.24	92.28	93.31	94.32	95.33	96.32	96.88	96.25	95.57	94.84	94.11	93.38	92.65	91.92	91.19	90.50	89.80	89.09	88.38				
			90.19	91.24	92.28	93.31	94.32	95.33	96.32	96.50	95.86	95.19	94.45	93.72	92.99	92.25	91.52	90.78	90.08	89.39	88.67	87.95				
5			84.65	85.64	86.61	87.58	88.53	89.48	90.41	91.34	92.25	93.16	94.06	94.95	95.56	94.83	94.10	93.37	92.63	91.90	91.18	90.48	89.78	89.11		
			84.65	85.64	86.61	87.58	88.53	89.48	90.41	91.34	92.25	93.16	94.06	94.50	93.76	93.02	92.27	91.52	90.77	90.02	89.29	88.57	87.86	87.18		
			84.65	85.64	86.61	87.58	88.53	89.48	90.41	91.34	92.25	93.16	94.06	94.20	93.45	92.71	91.96	91.20	90.45	89.70	88.96	88.24	87.53	86.84		
S.L.			79.60	80.53	81.44	82.35	83.25	84.14	85.02	85.88	86.75	87.60	88.44	89.28	90.11	90.93	91.74	92.55	92.77	91.99	91.22	90.51	89.80	89.07	88.34	88.23
			79.60	80.53	81.44	82.35	83.25	84.14	85.02	85.88	86.75	87.60	88.44	89.28	90.11	90.93	91.74	91.75	90.98	90.18	89.40	88.68	87.95	87.21	86.46	86.34
			79.60	80.53	81.44	82.35	83.25	84.14	85.02	85.88	86.75	87.60	88.44	89.28	90.11	90.93	91.74	91.50	90.72	89.92	89.14	88.41	87.69	86.94	86.19	86.07

STATIC AIR TEMPERATURE (SAT) ~ °C

xxx.xx ANTI-ICE OFF
xxx.xx NAC HT ONLY
xxx.xx FULL ANTI-ICE

CLIMB SPEED: 250 KIAS up to 32,000 FT
0.70 MI above 32,000 FT

Figure 5-31

EFFECTIVITY
All

MAXIMUM CONTINUOUS THRUST FOR CLIMB (N1)
SINGLE ENGINE

ALTITUDE ~ 1000 FT

	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55
51	97.88	97.66	97.44	97.21	96.85	95.57	94.36	93.74	93.12																	
	94.68	94.42	94.16	93.90	93.50	92.18	90.94	90.28	89.62																	
	93.98	93.72	93.45	93.18	92.77	91.44	90.19	89.52	88.86																	
50	97.88	97.66	97.44	97.22	96.85	95.57	94.37	93.75	93.13																	
	94.71	94.45	94.19	93.94	93.53	92.22	90.97	90.32	89.66																	
	94.02	93.75	93.48	93.22	92.80	91.48	90.23	89.57	88.90																	
45	99.03	98.82	98.61	98.39	98.18	97.41	96.15	95.21	94.60																	
	96.02	95.77	95.52	95.27	95.02	94.22	92.92	91.94	91.33																	
	95.34	95.08	94.83	94.57	94.31	93.50	92.20	91.21	90.56																	
40	98.92	100.13	100.67	100.46	100.26	100.05	98.98	97.75	96.99	96.40																
	98.13	98.00	97.76	97.52	97.28	97.04	95.94	94.67	93.89	93.26																
	97.59	97.34	97.09	96.84	96.59	96.35	95.24	93.96	93.17	92.54																
35	98.30	99.50	100.69	101.02	100.82	100.62	100.16	98.95	97.82	97.24	96.65	95.96														
	98.30	98.75	98.52	98.29	98.06	97.83	97.34	96.09	94.94	94.33	93.71	92.99														
	98.27	98.11	97.87	97.64	97.40	97.16	96.67	95.42	94.26	93.64	93.01	92.28														
30	97.81	99.00	100.19	101.35	101.26	101.07	100.88	99.89	98.69	97.88	97.27	96.60	95.88	95.17												
	97.81	99.00	99.19	98.97	98.75	98.53	98.31	97.30	96.08	95.23	94.59	93.90	93.16	92.42												
	97.81	98.81	98.58	98.35	98.13	97.90	97.67	96.66	95.42	94.57	93.93	93.23	92.48	91.73												
25		98.89	100.07	101.24	101.52	101.33	101.14	100.27	99.07	98.19	97.57	96.92	96.20	95.48	94.76	94.04										
		98.89	99.62	99.41	99.19	98.98	98.76	97.87	96.65	95.74	95.10	94.42	93.67	92.93	92.19	91.45										
		98.89	99.08	98.86	98.64	98.42	98.20	97.30	96.07	95.16	94.51	93.82	93.07	92.33	91.58	90.83										
20			99.99	101.15	101.81	101.63	101.44	100.65	99.47	98.54	97.92	97.27	96.55	95.83	95.11	94.39	93.67	92.94								
			99.99	99.92	99.71	99.50	99.29	98.48	97.27	96.32	95.68	95.00	94.26	93.52	92.78	92.04	91.29	90.55								
			99.67	99.46	99.24	99.03	98.81	98.00	96.78	95.83	95.18	94.50	93.76	93.01	92.27	91.52	90.77	90.02								
15			99.65	100.82	101.96	101.80	101.61	101.14	99.97	98.86	98.22	97.58	96.85	96.12	95.39	94.65	93.91	93.17	92.42	91.67						
			99.65	100.24	100.03	99.83	99.63	99.14	97.94	96.81	96.15	95.49	94.74	93.99	93.24	92.48	91.73	90.96	90.20	89.42						
			99.65	99.85	99.64	99.43	99.23	98.73	97.53	96.40	95.73	95.07	94.31	93.56	92.80	92.05	91.29	90.52	89.75	88.97						
10			91.54	92.61	93.66	94.70	95.74	96.76	97.77	98.77	98.45	97.79	97.08	96.33	95.59	94.85	94.11	93.35	92.60	91.81	91.02	90.30				
			91.54	92.61	93.66	94.70	95.74	96.76	97.77	97.31	96.56	95.88	95.15	94.39	93.63	92.87	92.10	91.34	90.56	89.75	88.95	88.21				
			91.54	92.61	93.66	94.70	95.74	96.76	97.77	96.93	96.18	95.50	94.76	94.00	93.23	92.47	91.70	90.93	90.15	89.34	88.53	87.79				
5			85.03	86.02	87.00	87.97	88.93	89.88	90.81	91.74	92.66	93.57	94.47	95.37	95.76	95.01	94.26	93.52	92.77	91.99	91.20	90.44	89.67	88.92		
			85.03	86.02	87.00	87.97	88.93	89.88	90.81	91.74	92.66	93.57	94.47	94.71	93.95	93.18	92.42	91.66	90.89	90.09	89.29	88.51	87.74	86.97		
			85.03	86.02	87.00	87.97	88.93	89.88	90.81	91.74	92.66	93.57	94.47	94.38	93.61	92.85	92.08	91.31	90.55	89.74	88.94	88.16	87.38	86.60		
S.L.			79.91	80.84	81.76	82.67	83.57	84.46	85.35	86.22	87.08	87.94	88.79	89.63	90.46	91.28	92.10	92.91	92.90	92.13	91.35	90.56	89.77	88.99	88.24	87.64
			79.91	80.84	81.76	82.67	83.57	84.46	85.35	86.22	87.08	87.94	88.79	89.63	90.46	91.28	92.10	91.87	91.11	90.33	89.53	88.73	87.92	87.13	86.36	85.74
			79.91	80.84	81.76	82.67	83.57	84.46	85.35	86.22	87.08	87.94	88.79	89.63	90.46	91.28	92.10	91.61	90.85	90.06	89.26	88.46	87.65	86.85	86.09	85.46

STATIC AIR TEMPERATURE (SAT) ~ °C

xxx.xx ANTI-ICE OFF
xxx.xx NAC HT ONLY
xxx.xx FULL ANTI-ICE

CLIMB SPEED: 200 KIAS up to 21,000 FT
0.45 MI from 21,000 to 29,000 FT
170 KIAS from 29,000 to 49,000 FT
0.70 MI from 49,000 to 51,000 FT

Figure 5-32

USE OF TAKEOFF CHARTS

MAXIMUM TAKEOFF WEIGHT

The charts on the following pages present the information necessary to determine the maximum allowable takeoff weight as limited by gross climb performance or brake energy limits. The climb limitations portion of the charts do not specify the limiting climb segment, only that any one or a combination of the climb segments (first, second, final, approach or landing) are limiting.

Takeoff must be made within the limitations of the maximum certified takeoff weight determined from TAKEOFF WEIGHT LIMITS chart and the performance determined from the TAKEOFF FIELD LENGTH chart.

Example:

1. Maximum certified takeoff weight.
2. From the applicable TAKEOFF WEIGHT LIMITS chart, determine maximum takeoff weight for airport altitude and reported surface temperature.
3. From the applicable TAKEOFF FIELD LENGTH chart, determine the maximum takeoff weight for the runway and ambient conditions.
4. The lowest of the weights from steps 1, 2, and 3 is the heaviest allowable weight at which the airplane can take off.

TAKEOFF FIELD LENGTH CHARTS

The TAKEOFF FIELD LENGTH charts in this manual are presented for 8° or 20° flap settings (rudder boost ON and OFF) and show the takeoff distance in terms of altitude, temperature, and weight, and also include corrections for wind, runway gradient, anti-skid on or off, anti-ice systems on or off and APR & Autospoilers armed or not armed. These charts may be used to determine either of the following:

1. The runway length required given the pressure altitude, airplane weight, surface temperature, runway gradient, and wind. The example on the applicable chart illustrates determination of runway length required.
2. The maximum airplane takeoff weight corresponding to a specific runway length, runway gradient, pressure altitude, surface temperature, and wind. Takeoff weight for runway length available may be determined by working through the chart in the opposite manner as finding runway length.

CALCULATION OF CORRECTION FOR RUNWAYS WITH A GRADIENT GREATER THAN 2.0% AND LESS THAN OR EQUAL TO 2.4%

The information provided here is used to calculate takeoff corrections for dry conditions with runway gradients >2.0% and ≤2.4%.

DOWNHILL (NEGATIVE) GRADIENT

Takeoff Weight Limit

It is not necessary to make corrections to the Takeoff Weight Limit for runways with a downhill gradient.

Takeoff Field Length

Determine Takeoff Field Length using the appropriate chart in this section and assume runway has a -2.2% gradient. Additional correction is not required.

Takeoff Decision Speed

Determine Takeoff Decision Speed (V1) using the appropriate chart in this section and assume runway has a -2.2% gradient. Additional correction is not required.

UPHILL (POSITIVE) GRADIENT

Takeoff Weight Limit

Determine Climb Weight Limit using the appropriate chart in this section. Adjust the Climb Weight Limit by subtracting the appropriate weight from the table below.

Takeoff Weight Limit	
Uphill Gradient	**Climb Weight Correction**
+2.1%	Subtract 125 pounds (56.7 kg)
+2.2%	Subtract 250 pounds (113.4 kg)
+2.3%	Subtract 375 pounds (170.1 kg)
+2.4%	Subtract 500 pounds (226.8 kg)

Determine the Brake Energy Weight Limit using the appropriate chart in this section. Additional correction is not required.

Takeoff Field Length

Determine Takeoff Field Length using the appropriate chart in this section. Correct for wind and runway gradient assuming a +2.2% gradient. Stop and multiply the Takeoff Field Length by 1.02. Continue across the chart with the corrected value making corrections for Anti-Skid, Anti-Ice, APR/Autospoilers, and Altitude as needed. Refer to the example on the following page.

Takeoff Decision Speed

Determine Takeoff Decision Speed (V1) using the appropriate chart in this section and assume runway has a +2.2% gradient. Additional correction is not required.

CALCULATION OF CORRECTION FOR RUNWAYS WITH A GRADIENT GREATER THAN 2.0% AND LESS THAN OR EQUAL TO 2.4% (Cont)

Example:
(For runways with positive [uphill] gradient)

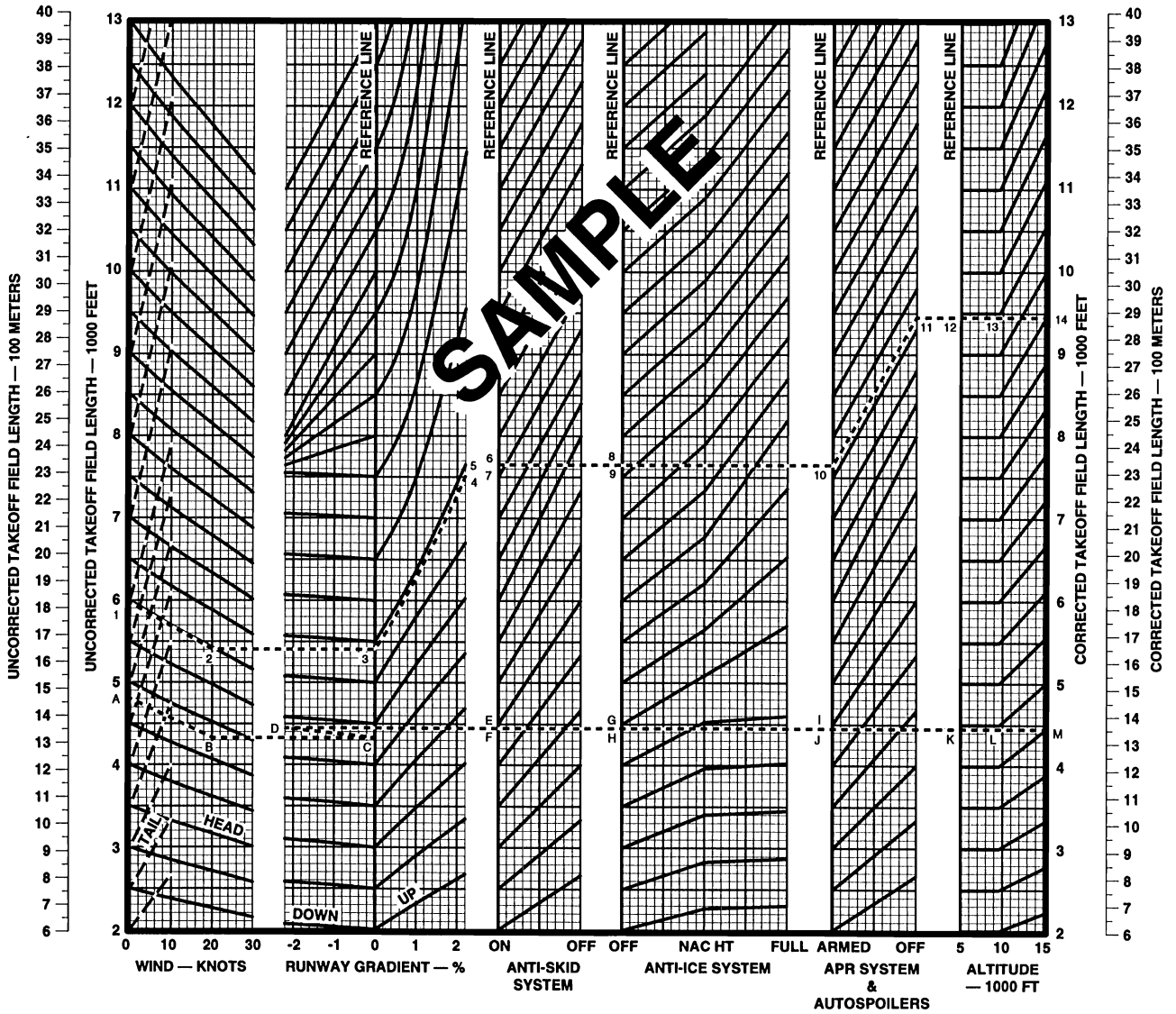
1. Uncorrected Takeoff Field Length (from AFM table) ..... 6,000 ft (1,829 m)
2. Headwind ..... 20 kt
3. Runway Gradient Reference Line
4. Runway Gradient ..... 2.2% UP
5. Takeoff Field Length Corrected for Wind and 2.2% Gradient ..... 7,500 ft (2,286 m)
   Answer from Step 5 Multiplied by 1.02 ..... 7,650 ft (2,332 m)
6. Anti-Skid System Reference Line ..... enter at 7,650 ft (2,332 m)
7. Anti-Skid System ..... ON
8. Anti-Ice System Reference Line
9. Anti-Ice System ..... OFF
10. APR and Autospoilers Reference Line
11. APR and Autospoilers System ..... OFF
12. Altitude Reference Line
13. Altitude ..... 8,000 ft
14. Corrected Takeoff Field Length ..... 9,450 ft (2,881 m)

Example:
(For runways with negative [downhill] gradient)

A. Uncorrected Takeoff Field Length (from AFM table) ..... 4,800 ft (1,463 m)
B. Headwind ..... 20 kt
C. Runway Gradient Reference Line
D. Runway Gradient ..... -2.2% DOWN

NOTE: Use -2.2% for all gradients >2.0% and ≤2.4%.

E. Anti-Skid System Reference Line
F. Anti-Skid System ..... ON
G. Anti-Ice System Reference Line
H. Anti-Ice System ..... OFF
I. APR and Autospoilers Reference Line
J. APR and Autospoilers System ..... ARMED
K. Altitude Reference Line
L. Altitude ..... 8,000 ft
M. Corrected Takeoff Field Length ..... 4,450 ft (1,357 m)



TAKEOFF FROM WET OR CONTAMINATED RUNWAY

Refer to the WET/CONTAMINATED RUNWAY DATA for guidance material pertaining to takeoff on a wet or contaminated runway.

TAKEOFF PROCEDURE

PERFORMANCE TAKEOFF PROCEDURE

Refer to the Standard Performance Conditions in the INTRODUCTION TO PERFORMANCE DATA at the beginning of this section.

ROLLING TAKEOFF PROCEDURE

NOTE

Add 300 feet to the scheduled takeoff field length when using the following procedures.

- **From Runway Centerline**
  1. Brakes — Release.
  2. Thrust Levers — Select TO thrust.
  3. Follow the performance takeoff procedure.

- **From Taxiway Turning Onto Runway**
  1. Brakes — Release.
  2. Turn onto active runway aligning with centerline.
  3. Thrust Levers — Select TO thrust.
  4. Follow the performance takeoff procedure.

TAKEOFF FLIGHT PATH CHARTS

The takeoff flight path is divided into segments defined by changes in the airplane configuration. The terms used in flight path plotting are defined as follows and illustrated on the TAKEOFF PROFILE figure.

Reference Zero	A point 35 feet above the runway surface at the final point of the takeoff run (takeoff distance).
First Segment	Segment extending from the 35-foot height at the end of the takeoff run (Reference Zero) to the height at the end of gear retraction.

NOTE

The First Segment of the Takeoff Flight Path represents only a portion of the First Segment Climb as shown on the TAKEOFF PROFILE figure.

Second Segment	Segment beginning at the end of gear retraction (end of first segment) and continuing to a height of up to 1500 feet above the runway at V_2 speed. For obstacle clearance, maintain second segment climb (gear up, flaps at takeoff setting, takeoff thrust, and V_2) until reaching obstacle clearance altitude. This procedure will produce the performance shown in the **TAKEOFF FLIGHT PATH** charts.
Transition Segment	Segment beginning at the end of second segment (1500 feet and thrust cutback to maximum continuous) for level-off, acceleration to V_2 + 20 KIAS and flap retraction to the en route configuration. The horizontal distance traversed during this segment will be less than 13.5 nautical miles at the most limiting conditions when field elevation of the departure airport is 8000 feet or less.
Effect of Wind on Flight Path	The effect of wind is to increase or decrease the climb gradients or horizontal distances on each segment of the flight path.

The **TAKEOFF FLIGHT PATH** charts presented in this manual are separated into **CLOSE-IN** and **DISTANT** flight paths. The **CLOSE-IN TAKEOFF FLIGHT PATH** chart facilitates determination of required gradients within approximately two miles horizontal distance from reference zero. The **DISTANT TAKEOFF FLIGHT PATH** chart facilitates determination of required gradients to nearly eight miles from reference zero.

On these charts, each flight path line is marked with numbers showing the net climb gradients required for obstacle clearance at the end of the first and second segment climb. The origin of each line is reference zero, and the slope of the line segments (scale vertical distance divided by scale horizontal distance) are the slopes of the required climb segments in space in zero wind conditions. Since the zero wind first and second segment climbs are uniquely related to each other for each airplane weight and environment, it can be seen that the actual flight path in still air can be obtained from the **TAKEOFF FLIGHT PATH** charts by knowing only one of the applicable gradients.

CLIMB GRADIENT CHARTS

Climb performance charts are presented in terms of altitude, outside air temperature, weight, wind, anti-ice systems on or off, and APR system armed or not armed. The gradients for First, Second, and Final Segments are read at the temperature and pressure altitude for the departure airport and are the net gradients that will be achieved at the appropriate segment of the Takeoff Flight Path. Conditions for achieving presented climb gradients are listed on the appropriate chart.

These charts show the net gradients available and are to be used with the TAKEOFF FLIGHT PATH Charts which show the required net gradients when flight planning for obstacle clearance.

DETERMINATION OF TAKEOFF FLIGHT PATH FOR OBSTACLE CLEARANCE

The weight used for the following determination is defined as the airplane weight at the beginning of the takeoff roll. Using this weight for each climb segment will result in some small conservatism, since the gradients are presented in terms of instantaneous gross weight rather than the weight at the beginning of takeoff roll.

When flight path planning for obstacle clearance is desired, the following procedure may be used:

1. From the applicable TAKEOFF WEIGHT LIMITS Chart, determine the highest weight at which a takeoff may be made for the reported surface temperature and pressure altitude.
2. From the applicable TAKEOFF FIELD LENGTH Chart, determine the highest weight at which a takeoff may be made using the runway gradient, appropriate wind component, field pressure altitude, and reported surface temperature. The lower of this weight and the weight from the TAKEOFF WEIGHT LIMITS Chart is the first trial takeoff gross weight.
3. Determine the horizontal distance of the obstacle from reference zero.
4. From the applicable TAKEOFF FLIGHT PATH Chart, for the first or second segment, depending on where the critical obstacle is considered to be, determine the required climb gradient for obstacle clearance (zero wind gradient).
5. From the applicable CLIMB GRADIENT Chart, determine the aircraft climb gradient performance.



It is noted at this point that a head wind serves to increase climb gradient performance, whereas a tail wind decreases climb gradient performance.

6. • If step 5 (climb gradient performance) is more than step 4 (required gradient), obstacle clearance is satisfactory.
   • If step 5 (climb gradient performance) is less than step 4 (required gradient), obstacle clearance is unsatisfactory and procedures must be repeated using a lesser weight. When weight is reduced to achieve obstacle clearance, note that the horizontal distance between the obstacle and reference zero increases, since the takeoff field length is less. Consequently an interpolative process is required to find the exact minimum gradient and maximum weight for obstacle clearance.

TAKEOFF PROFILE

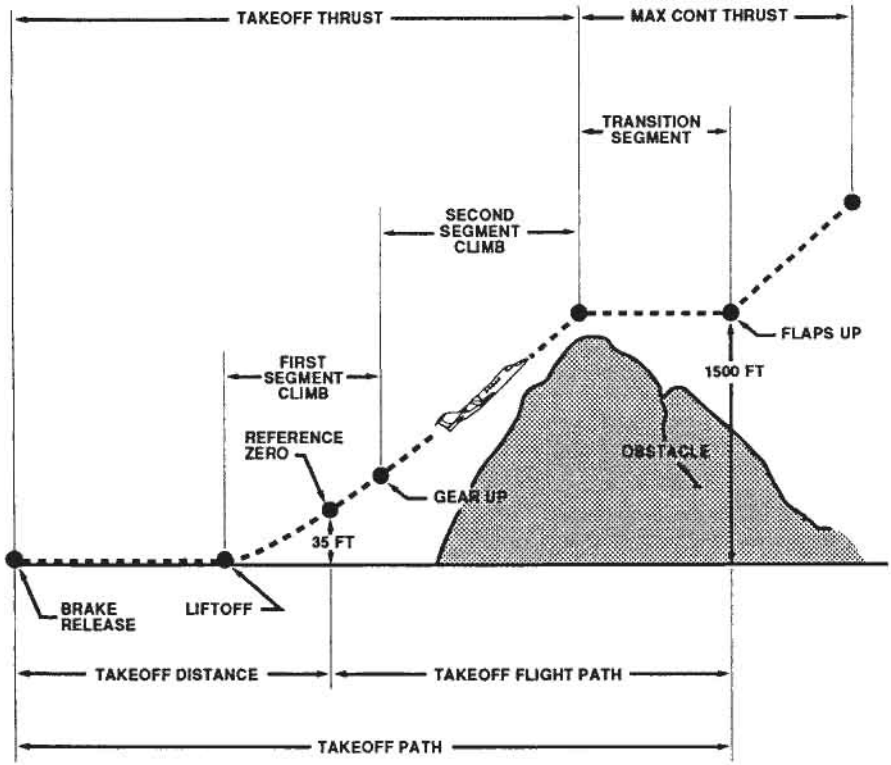


Figure 5-33

EXAMPLE:

1. Temperature ..... 80°F (26.7°C)
2. Altitude ..... 10,000 Ft
3. Climb Weight Limit ..... 21,350 Lb (9,684 Kg)
4. Wind Reference Line
5. Headwind ..... 9 Kt
6. Brake Energy Weight Limit ..... 20,000 Lb (9,072 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 20,000 Lb (9,072 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

EFFECTIVITY
All

TAKEOFF WEIGHT LIMIT
FLAPS — 8°, ANTI-ICE — OFF
APR & AUTOSPOILERS — ARMED

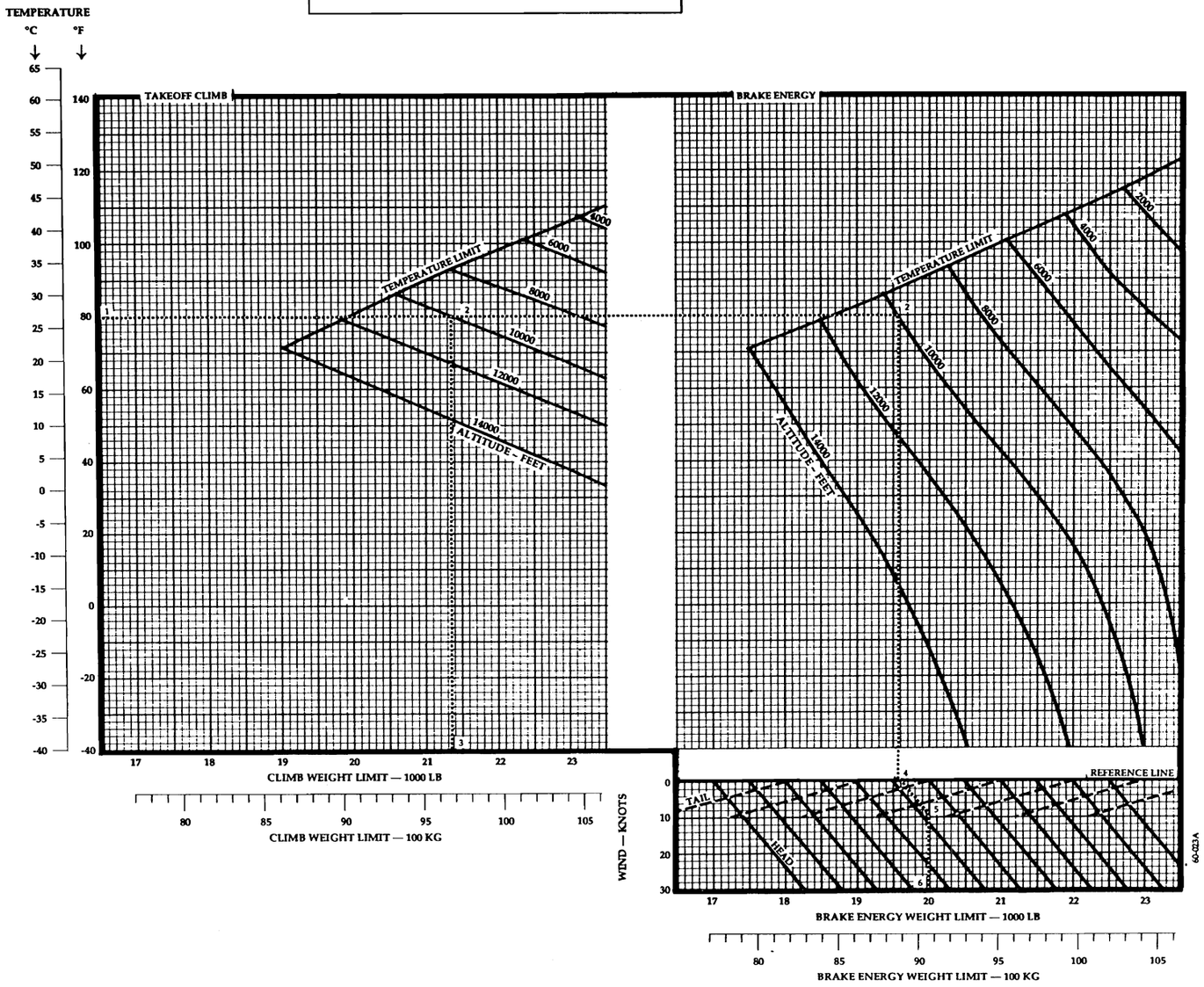


Figure 5-34

TAKEOFF WEIGHT LIMIT
FLAPS — 8°, ANTI-ICE — OFF
APR & AUTOSPOILERS — OFF

EFFECTIVITY
60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

EXAMPLE:

1. Temperature ..... 90°F (32.2°C)
2. Altitude ..... 8,000 Ft
3. Climb Weight Limit ..... 21,700 Lb (9,843 Kg)
4. Wind Reference Line
5. Tailwind ..... 4 Kt
6. Brake Energy Weight Limit ..... 19,400 Lb (8,800 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 19,400 Lb (8,800 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

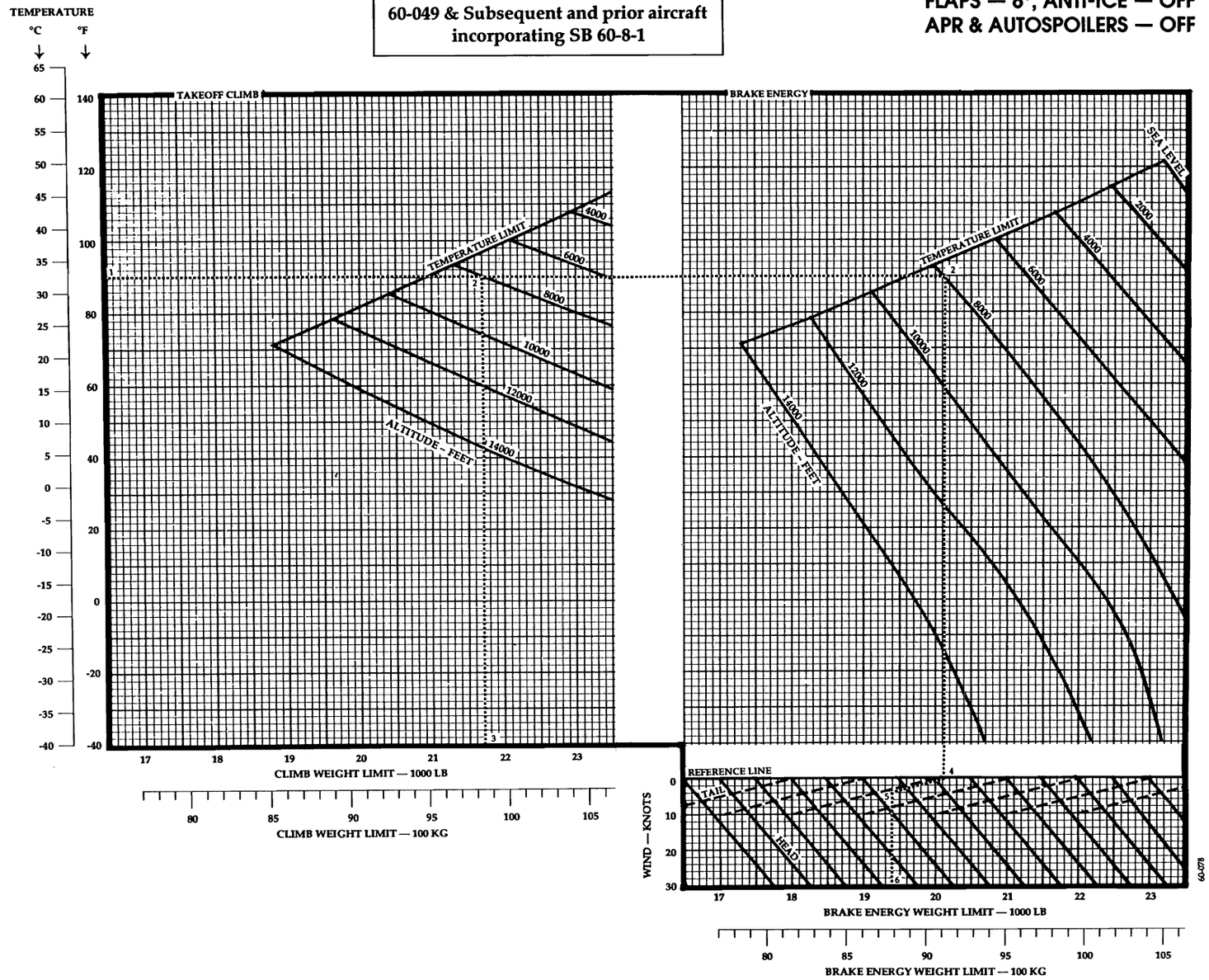


Figure 5-35

TAKEOFF WEIGHT LIMIT
FLAPS — 8°, ANTI-ICE — OFF
APR & AUTOSPOILERS — OFF

EFFECTIVITY
60-001 thru 60-048 not incorporating SB 60-8-1

EXAMPLE:

1. Temperature ..... 90°F (32.2°C)
2. Altitude ..... 8,000 Ft
3. Climb Weight Limit ..... 21,000 Lb (9,525 Kg)
4. Wind Reference Line
5. Tailwind ..... 4 Kt
6. Brake Energy Weight Limit ..... 19,400 Lb (8,800 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 19,400 Lb (8,800 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

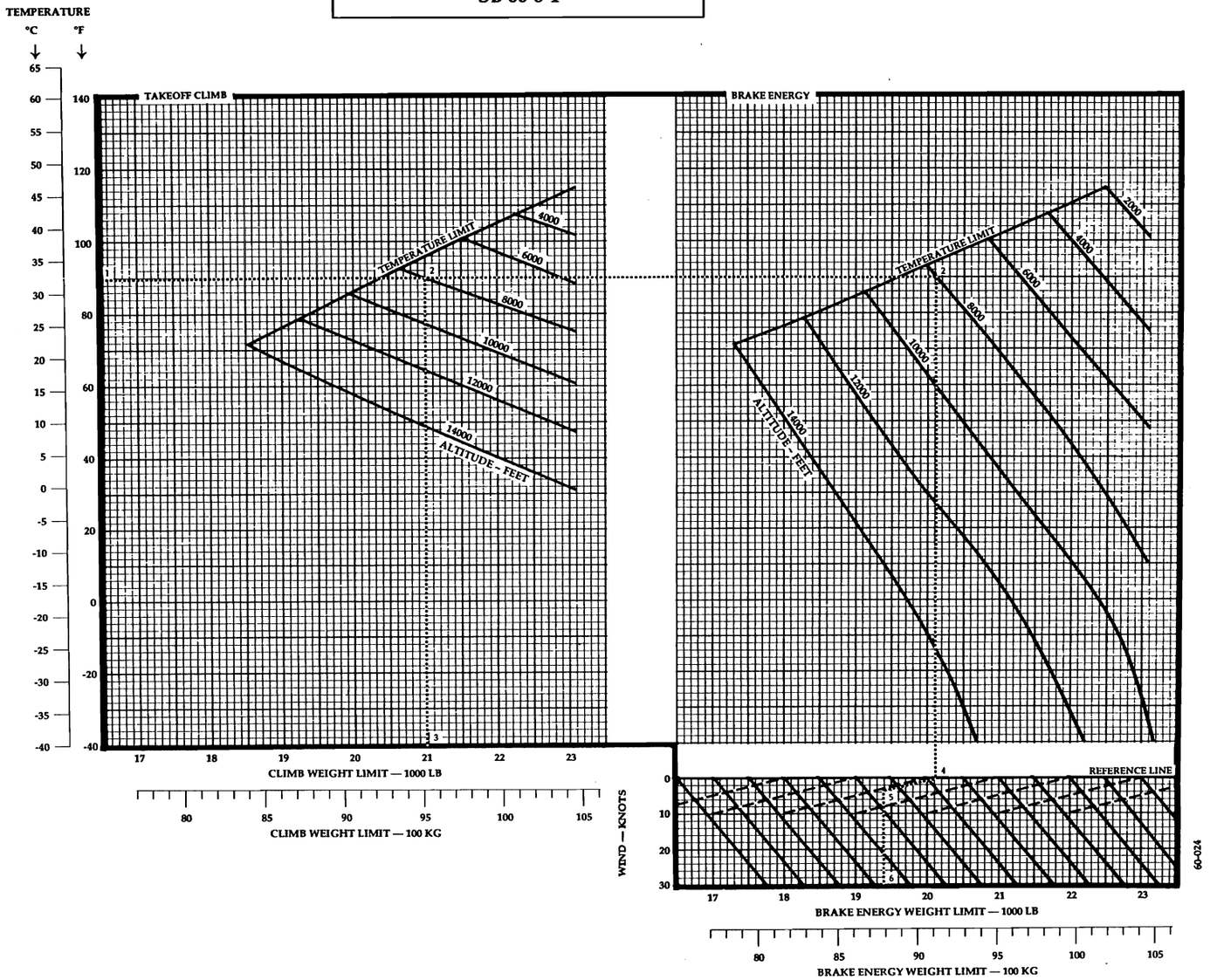


Figure 5-35.1

EFFECTIVITY
All

TAKEOFF WEIGHT LIMIT
FLAPS — 8°, ANTI-ICE — ON
APR & AUTOSPOILERS — ARMED

EXAMPLE:

1. Temperature ..... 24°F (-4.4°C)
2. Altitude (FULL ANTI-ICE) ..... 14,000 Ft
3. Climb Weight Limit ..... 20,400 Lb (9,253 Kg)
4. Wind Reference Line
5. Headwind ..... 20 Kt
6. Brake Energy Weight Limit ..... 19,650 Lb (8,913 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 19,650 Lb (8,913 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

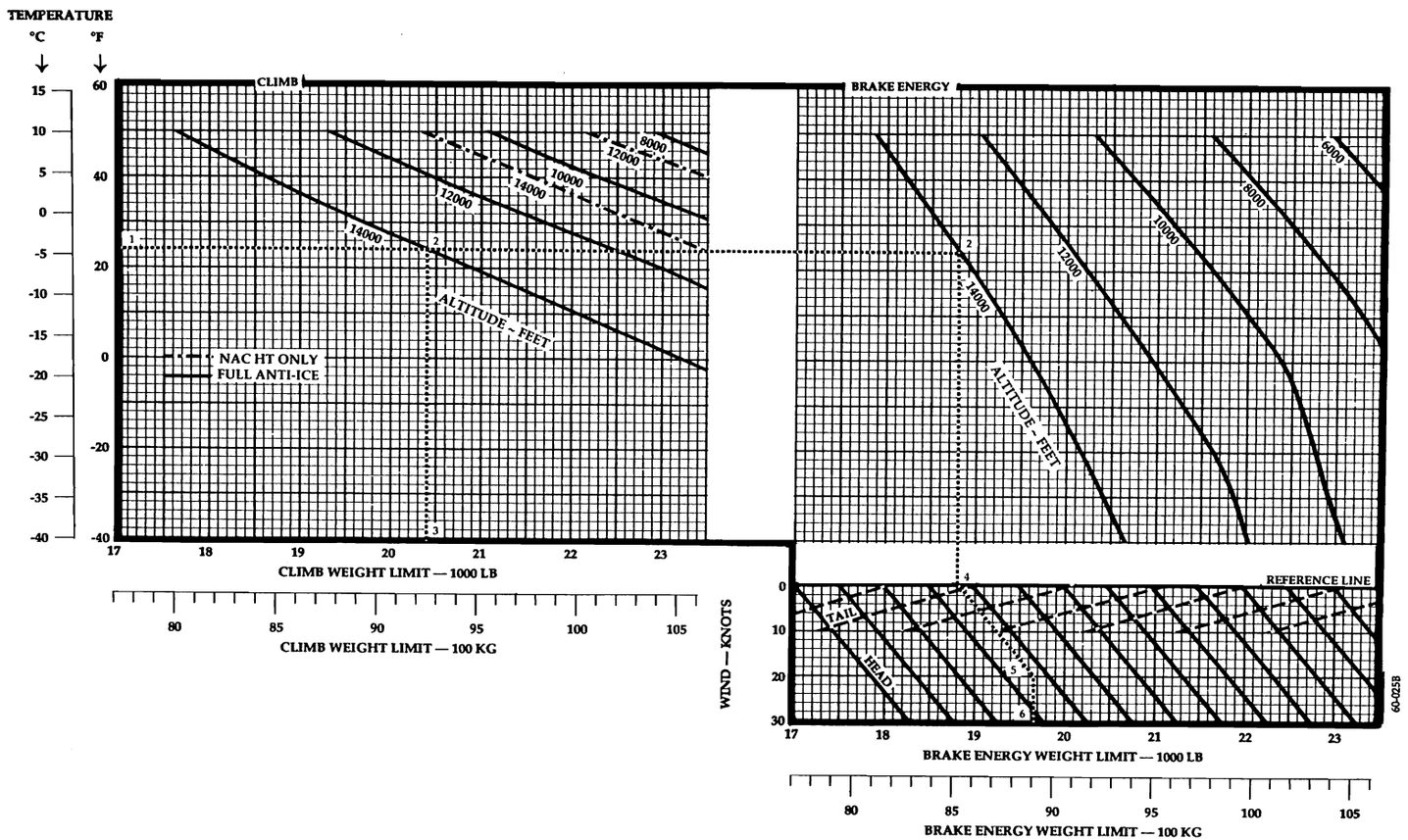


Figure 5-36

EFFECTIVITY
All

TAKEOFF WEIGHT LIMIT
FLAPS — 8°, ANTI-ICE — ON
APR & AUTOSPOILERS — OFF

EXAMPLE:

1. Temperature ..... 30°F (-1.1°C)
2. Altitude (FULL ANTI-ICE) ..... 12,000 Ft
3. Climb Weight Limit ..... 21,700 Lb (9,843 Kg)
4. Wind Reference Line
5. Headwind ..... 20 Kt
6. Brake Energy Weight Limit ..... 20,550 Lb (9,321 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 20,550 Lb (9,321 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

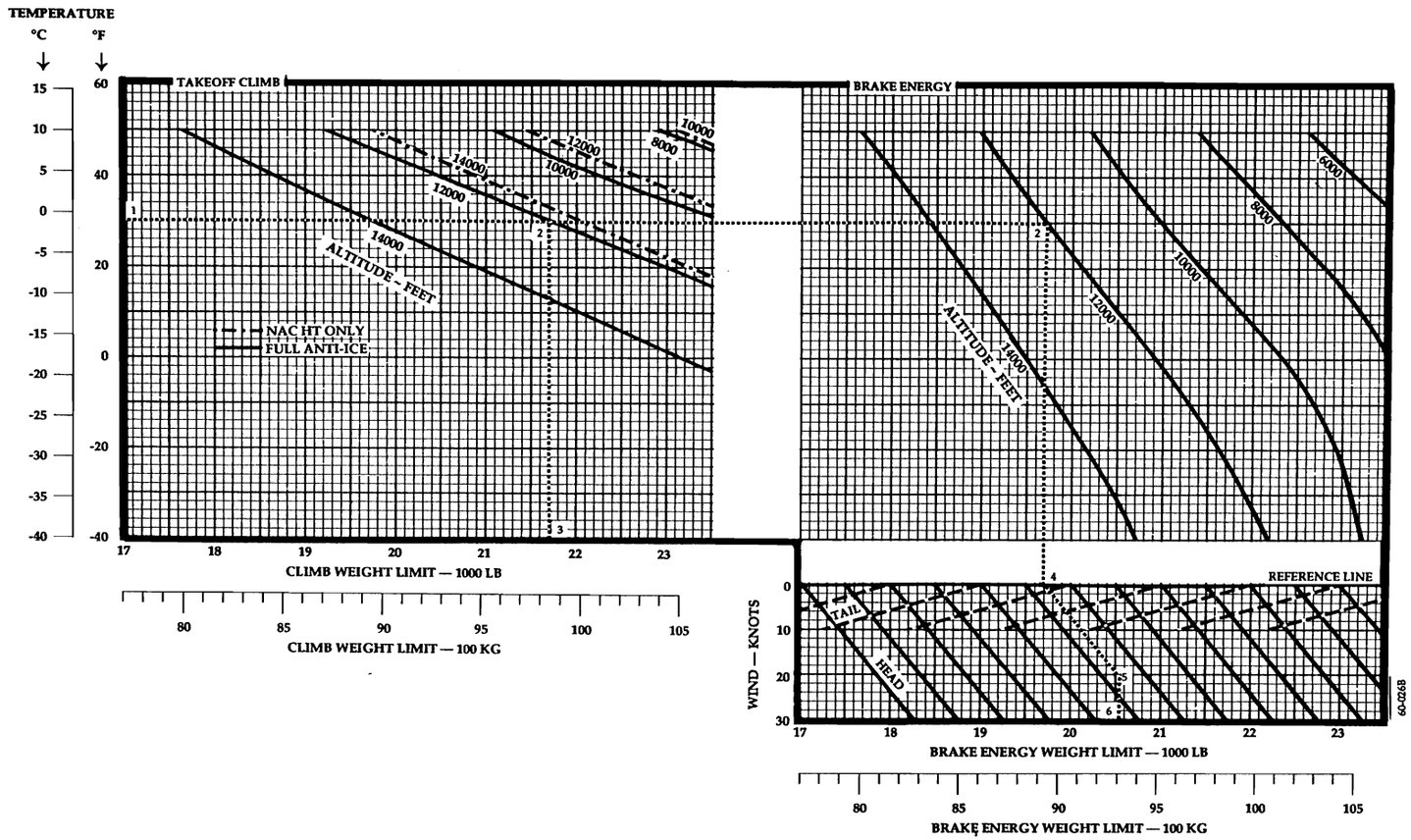


Figure 5-37

TAKEOFF FIELD LENGTH
FLAPS — 8°
Rudder Boost — ON

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		2470	2570	2660	2750	2850	2960	3020	3110	3280	3530	3800	4140		
	16,000		2610	2710	2810	2910	3020	3140	3190	3290	3480	3750	4060	4430		
	17,000		2780	2890	2990	3100	3210	3330	3400	3500	3700	3970	4290	4690		
	18,000		2990	3100	3210	3320	3450	3580	3650	3760	3970	4240	4550	4910		
	19,000		3250	3370	3500	3630	3770	3910	3990	4120	4370	4670	5020	5460		
	20,000		3530	3680	3820	3970	4130	4290	4370	4520	4800	5140	5560	6070		
	21,000		3850	4010	4170	4330	4510	4690	4780	4960	5260	5660	6170	6750		
	22,000		4180	4370	4540	4720	4920	5120	5230	5420	5760	6230	6830	7500		
	22,750		4450	4640	4830	5030	5240	5460	5570	5780	6160	6690	7350	8200		
	23,000		4550	4740	4940	5140	5360	5580	5700	5910	6310	6850	7560	8460		
	23,500		4740	4950	5160	5360	5600	5830	5950	6190	6610	7210	7890	8800		
1000	15,000		2560	2660	2750	2850	2960	3070	3160	3310	3520	3780	4100	4440		
	16,000		2700	2810	2910	3020	3130	3250	3340	3500	3740	4040	4370	4780		
	17,000		2880	2980	3100	3210	3330	3450	3560	3720	3950	4270	4630	5060		
	18,000		3090	3200	3320	3440	3570	3710	3820	3990	4240	4530	4880	5300		
	19,000		3360	3490	3630	3760	3910	4060	4190	4390	4670	5000	5400	5910		
	20,000		3660	3810	3960	4120	4280	4450	4590	4820	5140	5530	6020	6610		
	21,000		3990	4160	4330	4500	4680	4870	5030	5290	5650	6120	6690	7360		
	22,000		4340	4530	4720	4910	5110	5320	5500	5790	6210	6750	7440	8280		
	22,750		4620	4820	5020	5230	5440	5670	5870	6190	6650	7240	8040	8950		
	23,000		4720	4930	5140	5350	5570	5800	6000	6340	6830	7480	8280	9040		
	23,500		4920	5140	5360	5580	5820	6060	6290	6650	7150	7820	8760	9490		
2000	15,000		2650	2750	2850	2950	3070	3180	3310	3510	3770	4080	4440	4830		
	16,000		2800	2910	3020	3130	3250	3370	3510	3740	4020	4340	4720	5150		
	17,000		2970	3090	3200	3320	3450	3580	3730	3960	4260	4590	5000	5450		
	18,000		3190	3310	3440	3570	3700	3840	4000	4250	4530	4870	5250	5750		
	19,000		3480	3620	3760	3900	4050	4210	4400	4680	5000	5370	5840	6400		
	20,000		3790	3950	4110	4270	4440	4620	4830	5150	5520	5980	6520	7210		
	21,000		4140	4310	4490	4660	4860	5060	5290	5660	6100	6640	7240	8100		
	22,000		4510	4700	4900	5100	5310	5530	5800	6200	6740	7330	8150	8920		
	22,750		4800	5010	5220	5440	5660	5900	6190	6660	7230	7950	8880	9590		
	23,000		4900	5120	5340	5550	5790	6030	6340	6810	7420	8180	9020	9850		
	23,500		5120	5350	5570	5800	6050	6320	6630	7160	7800	8590	9390	10370		
3000	15,000		2730	2840	2940	3050	3170	3340	3530	3780	4070	4420	4780	5260		
	16,000		2890	3010	3110	3230	3350	3540	3750	4030	4350	4720	5170	5670		
	17,000		3070	3190	3310	3440	3570	3770	3970	4260	4600	4980	5440	5990		
	18,000		3290	3420	3550	3690	3830	4040	4270	4550	4870	5240	5720	6350		
	19,000		3590	3740	3890	4030	4190	4440	4690	5020	5380	5830	6380	7010		
	20,000		3930	4090	4250	4420	4600	4880	5160	5530	5970	6490	7120	7960		
	21,000		4280	4470	4650	4840	5030	5350	5670	6100	6610	7230	8000	8820		
	22,000		4670	4870	5080	5280	5500	5860	6220	6730	7340	8090	8960	9790		
	22,750		4970	5190	5410	5630	5870	6250	6660	7240	7930	8800	9530	10600		
	23,000		5080	5310	5530	5760	6010	6400	6830	7430	8150	8970	9790	10900		
	23,500		5300	5530	5780	6020	6290	6700	7150	7800	8530	9400	10310			
4000	15,000		2820	2930	3050	3160	3270	3520	3780	4080	4390	4780	5230			
	16,000		2980	3100	3220	3340	3470	3740	4020	4360	4700	5090	5620			
	17,000		3170	3300	3430	3550	3690	3970	4260	4600	4990	5430	5990			
	18,000		3400	3530	3680	3810	3960	4270	4560	4890	5250	5700	6240			
	19,000		3710	3870	4020	4170	4340	4700	5020	5400	5820	6350	6980			
	20,000		4060	4230	4410	4580	4770	5170	5530	5970	6490	7110	7870			
	21,000		4430	4630	4820	5020	5220	5670	6090	6620	7230	7940	8840			
	22,000		4840	5050	5260	5470	5710	6210	6710	7340	8060	8910	9710			
	22,750		5150	5380	5610	5850	6090	6640	7210	7920	8740	9520	10610			
	23,000		5270	5500	5740	5980	6230	6790	7380	8150	9010	9750	10810			
	23,500		5490	5740	5990	6240	6530	7110	7790	8510	9550	10260	11430			
5,000	15,000		2930	3050	3170	3280	3420	3780	4080	4420	4760	5260	5780			
	16,000		3110	3220	3350	3480	3640	4030	4340	4710	5100	5600	6230			
	17,000		3300	3430	3570	3700	3860	4270	4600	4970	5410	5880	6560			
	18,000		3540	3680	3830	3970	4150	4580	4890	5260	5680	6220	6830			
	19,000		3870	4030	4200	4360	4550	5060	5420	5840	6370	6980	7770			
	20,000		4240	4420	4600	4790	5010	5580	5990	6500	7120	7810	8640			
	21,000		4630	4840	5040	5240	5490	6140	6630	7240	7910	8870	9670			
	22,000		5060	5280	5510	5730	6010	6760	7350	8060	8940	9710	10790			
	22,750		5390	5630	5870	6120	6420	7250	7920	8700	9540	10490	11750			
	23,000		5510	5770	6010	6260	6580	7430	8140	8990	9780	10790				
	23,500		5760	6020	6280	6550	6870	7820	8580	9460	10270	11390				
6,000	15,000		3060	3180	3290	3410	3580	4080	4410	4770	5170	5720				
	16,000		3230	3350	3490	3620	3800	4370	4680	5130	5610	6170				
	17,000		3430	3570	3710	3850	4040	4620	4970	5390	5880	6540				
	18,000		3670	3830	3980	4130	4340	4920	5270	5680	6200	6820				
	19,000		4030	4200	4370	4540	4780	5450	5850	6360	6930	7670				
	20,000		4420	4600	4800	4990	5250	6020	6500	7080	7820	8720				
	21,000		4830	5040	5250	5470	5760	6650	7220	7940	8740	9610				
	22,000		5270	5510	5740	5980	6310	7360	8050	8880	9700	10720				
	22,750		5620	5870	6130	6380	6740	7890	8670	9700	10450	11640				
	23,000		5760	6010	6270	6550	6920	8160	8940	9810	10750					
	23,500		6010	6290	6560	6860	7250	8600	9490	10250	11340					

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		3160	3280	3400	3540	3840	4420	4780	5210	5710	6290			
	16,000		3330	3470	3610	3760	4080	4710	5080	5510	6090	6730			
	17,000		3550	3700	3850	4000	4320	4980	5390	5860	6440	7120			
	18,000		3830	3980	4140	4310	4660	5320	5710	6190	6750	7510			
	19,000		4190	4370	4550	4740	5140	5910	6380	6940	7640	8510			
	20,000		4600	4800	5000	5210	5670	6570	7110	7800	8660	9470			
	21,000		5030	5260	5480	5720	6230	7270	7950	8780	9590	10600			
	22,000		5500	5750	5990	6260	6860	8090	8930	9720	10680				
	22,750		5870	6130	6410	6700	7360	8780	9730	10470	11580				
	23,000		6010	6280	6560	6870	7530	9040	10000	10760					
	23,500		6290	6580	6870	7180	7930	9510	10330	11330					
8000	15,000		3270	3400	3520	3670	4120	4790	5220	5690	6130	6670			
	16,000		3450	3590	3740	3900	4370	5110	5520	5990	6580	7400			
	17,000		3680	3830	3990	4160	4630	5400	5850	6420	7020	7810			
	18,000		3960	4130	4290	4470	4990	5740	6200	6760	7420	8220			
	19,000		4350	4530	4720	4930	5520	6420	6960	7620	8380	9250			
	20,000		4770	4980	5180	5420	6100	7150	7810	8600	9410	10380			
	21,000		5220	5460	5690	5950	6720	7980	8760	9690	10500	11700			
	22,000		5720	5970	6230	6520	7450	8940	9900	10630					
	22,750		6090	6390	6660	6980	7980	9740	10480	11510					
	23,000		6250	6530	6840	7160	8230	9960	10760	11840					
	23,500		6540	6840	7140	7520	8650	10370	11320						
9000	15,000		3370	3510	3650	3940	4460	5250	5710	6250	6780				
	16,000		3570	3730	3880	4170	4750	5600	6120	6690	7400				
	17,000		3820	3980	4150	4450	5030	5870	6360	7040	7720				
	18,000		4140	4310	4490	4830	5450	6320	6840	7520	8270				
	19,000		4550	4740	4950	5330	6040	7090	7740	8460	9370				
	20,000		4980	5210	5440	5870	6710	7950	8720	9720	10480				
	21,000		5470	5710	5970	6460	7460	8910	9900	10640	11790				
	22,000		5990	6260	6550	7120	8280	10060	10820	11920					
	22,750		6410	6700	7030	7640	8970	10680	11710						
	23,000		6570	6880	7190	7860	9210	10980	12050						
	23,500		6890	7210	7550	8230	9640	11560							
10000	15,000		3490	3630	3790	4200	4860	5700	6260	6870	7490				
	16,000		3690	3850	4030	4480	5210	6110	6640	7370	8310				
	17,000		3950	4120	4300	4760	5490	6430	7030	7660	8590				
	18,000		4280	4460	4660	5170	5910	6910	7520	8280	9290				
	19,000		4710	4910	5140	5720	6590	7760	8490	9500	10290				
	20,000		5170	5400	5650	6310	7340	8770	9680	10510	11630				
	21,000		5680	5930	6210	6960	8160	9910	10690	11790					
	22,000		6210	6510	6810	7680	9190	10900	11960						
	22,750		6650	6980	7320	8270	9950	11780							
	23,000		6830	7140	7490	8530	10270	12130							
	23,500		7160	7490	7860	8960	10660	12800							
12,000	15,000		3830	4110	4460	4970	5750	6820	7550	8430					
	16,000		4050	4360	4730	5280	6160	7380	8110	9200					
	17,000		4350	4650	5030	5590	6500	7710	8390	9260					
	18,000		4770	5100	5520	6140	7140	8530	9370	10260					
	19,000		5250	5640	6120	6860	8060	9750	10540	11640					
	20,000		5790	6230	6800	7650	9060	10840	11900						
	21,000		6360	6880	7560	8520	10240	12160							
	22,000		7010	7610	8340	9540	11330								
	22,750		7530	8210	9010	10330	12270								
	23,000		7700	8420	9360	10680	12640								
	23,500		8110	8860	9810	11230	13360								
14,000	15,000		4470	4830	5250	5910	6990	8330	9300	9890					
	16,000		4740	5110	5540	6280	7370	8900	9530	10390					
	17,000		5130	5500	5960	6760	7900	9560	10310	11280					
	18,000		5700	6150	6700	7630	8960	10780	11750						
	19,000		6340	6850	7510	8580	10340	12220							
	20,000		7030	7620	8420	9680	11480								
	21,000		7810	8510	9370	11040	12910								
	22,000		8640	9540	10620	12130									
	22,750		9350	10330	11440	13160									
	23,000		9670	10660	11670	13560									
	23,500		10100	11270	12290										

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-39.

Figure 5-38

TAKEOFF FIELD LENGTH
FLAPS — 8°
Rudder Boost — ON

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		2520	2610	2710	2810	2910	3020	3080	3170	3330	3590	3890	4240		
	16,000		2660	2760	2860	2970	3080	3190	3250	3360	3540	3820	4150	4530		
	17,000		2820	2920	3030	3140	3260	3380	3440	3560	3750	4040	4370	4770		
	18,000		3010	3120	3240	3360	3490	3620	3690	3820	4020	4300	4620	5020		
	19,000		3280	3400	3530	3670	3810	3960	4040	4180	4410	4720	5090	5550		
	20,000		3570	3720	3870	4020	4180	4340	4430	4590	4840	5200	5640	6190		
	21,000		3900	4060	4220	4390	4570	4750	4850	5030	5320	5740	6250	6890		
	22,000		4240	4420	4600	4790	4990	5190	5300	5510	5840	6330	6940	7650		
	22,750		4520	4710	4900	5110	5330	5550	5660	5880	6250	6780	7510	8380		
	23,000		4620	4820	5020	5220	5450	5670	5790	6020	6390	6990	7630	8570		
	23,100		4650	4860	5060	5270	5490	5720	5840	6070	6470	7070	7730	8640		
1000	15,000		2600	2700	2800	2900	3010	3120	3220	3370	3580	3860	4190	4570		
	16,000		2750	2850	2960	3070	3190	3300	3410	3580	3800	4100	4480	4870		
	17,000		2910	3030	3140	3250	3380	3500	3610	3780	4030	4340	4730	5150		
	18,000		3110	3240	3360	3480	3610	3750	3870	4050	4300	4600	4970	5420		
	19,000		3390	3530	3670	3800	3950	4100	4240	4440	4720	5070	5480	6010		
	20,000		3700	3860	4010	4160	4340	4500	4650	4890	5200	5610	6090	6720		
	21,000		4040	4210	4380	4550	4740	4930	5100	5360	5720	6200	6770	7540		
	22,000		4400	4590	4780	4970	5180	5400	5570	5880	6300	6860	7530	8450		
	22,750		4690	4890	5100	5300	5520	5760	5960	6300	6780	7380	8230	9970		
	23,000		4790	5000	5210	5420	5660	5890	6090	6440	6940	7570	8440	9200		
	23,100		4830	5040	5260	5470	5700	5940	6150	6520	7000	7660	8560	9290		
2000	15,000		2690	2800	2900	3010	3120	3230	3360	3570	3840	4160	4530	4930		
	16,000		2840	2960	3070	3170	3290	3420	3580	3800	4100	4430	4810	5290		
	17,000		3010	3130	3240	3370	3500	3630	3790	4040	4340	4690	5120	5670		
	18,000		3220	3350	3480	3610	3750	3890	4060	4310	4610	4940	5370	5880		
	19,000		3510	3650	3800	3940	4100	4260	4450	4730	5070	5450	5940	6510		
	20,000		3840	4000	4160	4320	4490	4670	4890	5220	5600	6060	6630	7350		
	21,000		4190	4360	4540	4720	4920	5120	5360	5730	6190	6750	7410	8240		
	22,000		4560	4760	4960	5160	5380	5600	5870	6300	6850	7480	8300	9060		
	22,750		4860	5080	5290	5500	5740	5990	6280	6760	7370	8130	8950	9780		
	23,000		4970	5190	5410	5630	5880	6120	6430	6920	7560	8290	9110	10030		
	23,100		5010	5240	5460	5690	5930	6180	6500	7020	7640	8400	9210	10150		
3000	15,000		2780	2890	2990	3100	3220	3400	3600	3860	4170	4530	4940	5440		
	16,000		2940	3060	3160	3280	3410	3610	3820	4100	4430	4830	5280	5820		
	17,000		3110	3230	3350	3480	3610	3820	4050	4350	4700	5090	5580	6230		
	18,000		3330	3460	3590	3730	3870	4100	4340	4630	4960	5390	5880	6500		
	19,000		3630	3780	3930	4080	4240	4500	4750	5090	5470	5950	6530	7260		
	20,000		3970	4130	4310	4470	4650	4940	5230	5610	6090	6650	7320	8220		
	21,000		4330	4520	4710	4890	5100	5420	5760	6200	6730	7410	8270	9040		
	22,000		4730	4930	5140	5350	5580	5940	6310	6840	7500	8260	9080	10080		
	22,750		5040	5260	5480	5710	5950	6350	6790	7380	8120	9050	9780	10980		
	23,000		5150	5380	5610	5840	6090	6510	6940	7570	8270	9190	10050	11390		
	23,100		5200	5430	5660	5890	6140	6570	7010	7650	8380	9260	10160	11550		
4000	15,000		2870	2980	3100	3210	3330	3590	3850	4180	4530	4920	5420			
	16,000		3030	3150	3270	3390	3530	3820	4110	4440	4840	5310	5850			
	17,000		3210	3340	3470	3600	3730	4040	4350	4690	5130	5590	6150			
	18,000		3440	3580	3720	3860	4010	4330	4640	4980	5380	5890	6480			
	19,000		3750	3910	4060	4220	4390	4760	5090	5480	5950	6500	7230			
	20,000		4100	4280	4460	4630	4820	5240	5620	6090	6630	7320	8100			
	21,000		4480	4680	4870	5070	5280	5750	6190	6750	7410	8240	9040			
	22,000		4900	5110	5330	5550	5780	6310	6820	7500	8220	9120	10070			
	22,750		5220	5460	5690	5920	6180	6760	7340	8030	8970	9770	10900			
	23,000		5330	5580	5820	6060	6310	6920	7520	8260	9290	10040	11240			
	23,100		5380	5630	5870	6110	6370	6980	7590	8360	9400	10140	11380			
5,000	15,000		2980	3100	3220	3330	3470	3860	4160	4530	4890	5400	5950			
	16,000		3150	3280	3410	3530	3690	4100	4440	4810	5210	5750	6350			
	17,000		3340	3470	3610	3740	3910	4350	4680	5100	5530	6130	6800			
	18,000		3580	3720	3870	4020	4200	4650	4980	5360	5830	6380	7090			
	19,000		3910	4070	4240	4400	4610	5120	5490	5950	6490	7140	7980			
	20,000		4280	4470	4650	4840	5060	5640	6080	6640	7270	8060	8980			
	21,000		4680	4890	5090	5300	5550	6220	6730	7400	8140	9020	9900			
	22,000		5110	5340	5570	5800	6080	6850	7490	8260	9170	9930	11090			
	22,750		5450	5700	5950	6190	6500	7360	8090	8970	9720	10760	12280			
	23,000		5580	5830	6080	6350	6660	7530	8310	9240	9990	11070	12530			
	23,100		5630	5880	6150	6410	6720	7600	8400	9270	10090	11200	13070			
6,000	15,000		3100	3220	3340	3470	3640	4160	4510	4870	5370	5860				
	16,000		3270	3410	3540	3680	3870	4420	4800	5210	5710	6330				
	17,000		3470	3610	3750	3890	4090	4690	5070	5530	6010	6630				
	18,000		3710	3870	4020	4180	4390	4980	5360	5830	6340	6960				
	19,000		4070	4240	4410	4580	4820	5500	5940	6480	7060	7850				
	20,000		4460	4650	4850	5030	5300	6080	6610	7220	7980	8870				
	21,000		4870	5090	5310	5520	5820	6730	7340	8060	9030	9770				
	22,000		5330	5570	5810	6040	6390	7440	8140	9010	9880	10930				
	22,750		5690	5940	6210	6460	6840	8010	8890	9750	10670	11900				
	23,000		5810	6080	6350	6620	7000	8210	9160	9990	10970					
	23,100		5870	6140	6410	6680	7060	8300	9270	10090	11100					

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		3210	3330	3450	3590	3900	4510	4870	5330	5900	6610			
	16,000		3380	3520	3670	3810	4130	4810	5240	5740	6320	7080			
	17,000		3590	3740	3890	4050	4390	5070	5530	6010	6680	7360			
	18,000		3860	4020	4170	4340	4700	5380	5800	6340	6970	7750			
	19,000		4230	4410	4590	4790	5190	5970	6500	7140	7840	8630			
	20,000		4640	4850	5040	5260	5720	6650	7240	7980	8940	9760			
	21,000		5080	5310	5530	5770	6290	7360	8120	8960	9840	10960			
	22,000		5560	5810	6060	6320	6940	8220	9080	9940	11000				
	22,750		5930	6210	6480	6770	7450	8840	9940	10730	11950				
	23,000		6080	6350	6650	6950	7620	9120	10030	11040					
	23,100		6130	6400	6700	7010	7690	9240	10510	11640					
8000	15,000		3310	3440	3580	3730	4190	4860	5330	5870	6500	7350			
	16,000		3510	3650	3800	3950	4450	5190	5640	6270	6980	8120			
	17,000		3720	3880	4030	4200	4710	5500	6030	6650	7410	8100			
	18,000		3990	4160	4320	4510	5040	5810	6320	6930	7680	8680			
	19,000		4380	4570	4760	4970	5570	6500	7090	7850	8810	9660			
	20,000		4810	5020	5230	5470	6160	7250	7980	8810	9730	10900			
	21,000		5270	5500	5740	6010	6790	8100	8980	9830	10910	12500			
	22,000		5770	6030	6290	6590	7530	9020	9930	10940					
	22,750		6170	6450	6730	7050	8080	9840	10680	11860					
	23,000		6310	6590	6910	7240	8290	10180	10980	12230					
	23,100		6360	6670	6970	7300	8370	10300	11570						
9000	15,000		3420	3550	3700	3980	4540	5340	5840	6410	7120				
	16,000		3620	3780	3930	4230	4840	5700	6160	6800	7800				
	17,000		3860	4020	4190	4490	5100	5970	6570	7180	8120				
	18,000		4170	4340	4530	4860	5500	6390	6990	7690	8630				
	19,000		4580	4780	4990	5370	6100	7180	7900	8780	9840				
	20,000		5030	5250	5490	5930	6770	8070	8930	9770	10850				
	21,000		5520	5770	6030	6520	7540	9070	9910	10920	12240				
	22,000		6040	6320	6610	7180	8320	10170	11010	12260					
	22,750		6460	6760	7090	7710	9000	10830	11940						
	23,000		6630	6940	7260	7890	9250	11110	12290						
	23,100		6690	7000	7320	8010	9360	11230							
10000	15,000		3530	3680	3830	4260	4910	5850	6280	6990	7900				
	16,000		3740	3900	4070	4550	5260	6160	6830	7480	8780				
	17,000		3990	4160	4340	4800	5550	6520	7210	8000	9710				
	18,000		4310	4490	4690	5200	5950	6990	7660	8520	9370				
	19,000		4740	4950	5170	5760	6650	7860	8700	9580	10590				
	20,000		5210	5440	5700	6360	7400	8920	9930	10720	12000				
	21,000		5720	5980	6250	7020	8250	10050	10880	12080	13860				
	22,000		6260	6550	6860	7750	9210	11020	12170						
	22,750		6700	7010	7370	8350	9950	11940							
	23,000		6880	7190	7550	8550	10330	12290							
	23,100		6940	7260	7610	8640	10480	12420							
12,000	15,000		3860	4130	4470	5030	5820	6950	7700	8650					
	16,000		4100	4390	4760	5380	6250	7520	8230	9010					
	17,000		4390	4680	5050	5660	6580	7850	8680	9440					
	18,000		4800	5120	5530	6190	7200	8640	9590	10410					
	19,000		5290	5650	6130	6920	8130	9870	10660	11820					
	20,000		5820	6220	6770	7720	9110	10910	12040						
	21,000		6400	6860	7520	8610	10280	12270							
	22,000		7040	7580	8300	9540	11390								
	22,750		7580	8120	9000	10470	12330								
	23,000		7760	8370	9240	10810	12680								
	23,100		7830	8440	9330	10770	12810								
14,000	15,000		4510	4880	5300	5970	7020	8520	9110	10260					
	16,000		4790	5170	5610	6390	7480	8890	9700	10720					
	17,000		5160	5540	5990	6800	7970	9570	10440	11550					
	18,000		5730	6180	6730	7680	9070	10820	11930						
	19,000		6370	6910	7520	8650	10380	12280							
	20,000		7070	7680	8410	9780	11530								
	21,000		7860	8580	9440	11070	12960								
	22,000		8710	9520	10550	12180									
	22,750		9430	10250	11540	13200									
	23,000		9700	10600	11690	13600									
	23,100		9800	10760	11800	13740									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-39.

Figure 5-38.1

EFFECTIVITY
All

TAKEOFF FIELD LENGTH CORRECTION CHART
FLAPS — 8°
Rudder Boost — ON

EXAMPLE:

1. Uncorrected Takeoff Field Length (from table) .....7,500 Ft (2,286 M)
2. Headwind ..... 20 Kt
3. Runway Gradient Reference Line
4. Runway Gradient..... -1.4% DN
5. Anti-Skid System Reference Line
6. Anti-Skid System .....ON
7. Anti-Ice System Reference Line
8. Anti-Ice System ..... OFF
9. APR and Autospoilers Reference Line
10. APR and Autospoilers System..... OFF
11. Altitude Reference Line
12. Altitude ..... 8,000 Ft
13. Corrected Takeoff Field Length ....7,550 Ft (2,301 M)

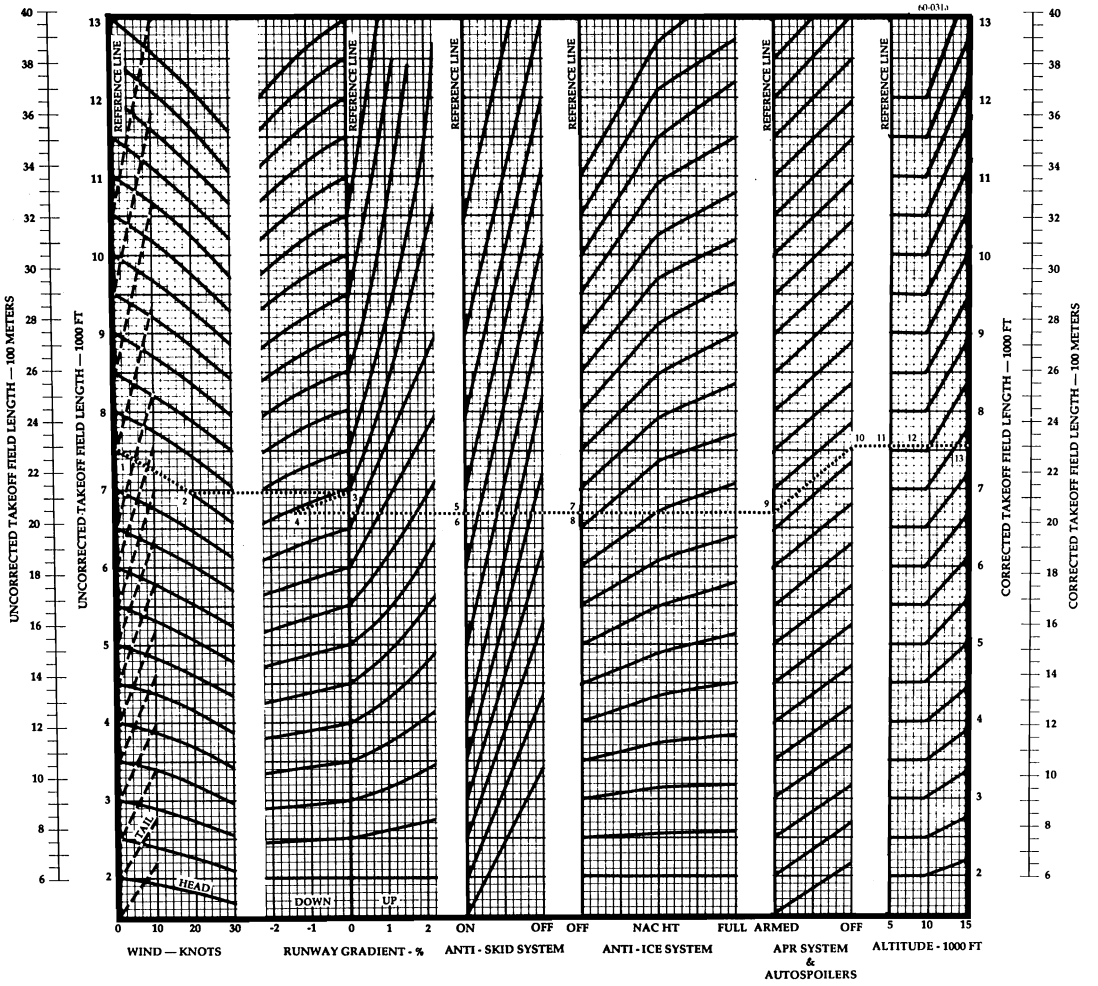


Figure 5-39

TAKEOFF FIELD LENGTH
FLAPS — 8°
Rudder Boost — OFF

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		3170	3260	3350	3450	3550	3670	3730	3820	3960	4100	4260	4430		
	16,000		3210	3310	3410	3520	3630	3750	3820	3910	4060	4220	4380	4570		
	17,000		3250	3360	3480	3600	3720	3840	3910	4010	4170	4330	4510	4710		
	18,000		3310	3430	3550	3670	3800	3930	4000	4110	4280	4450	4650	4920		
	19,000		3380	3500	3630	3760	3890	4030	4100	4220	4400	4670	5020	5460		
	20,000		3530	3680	3820	3970	4130	4290	4370	4530	4800	5140	5560	6070		
	21,000		3850	4010	4170	4330	4510	4690	4780	4950	5260	5660	6160	6760		
	22,000		4180	4360	4540	4720	4920	5120	5220	5420	5760	6230	6820	7500		
	22,750		4450	4640	4830	5020	5240	5460	5570	5780	6150	6690	7360	8200		
	23,000		4540	4740	4940	5140	5360	5580	5700	5910	6310	6840	7570	8450		
	23,500		4740	4950	5150	5360	5600	5830	5950	6190	6610	7210	7890	8800		
1000	15,000		3260	3360	3450	3560	3680	3790	3880	4000	4140	4300	4470	4660		
	16,000		3300	3410	3520	3640	3760	3880	3980	4100	4260	4420	4600	4810		
	17,000		3360	3480	3600	3720	3850	3980	4080	4210	4380	4550	4750	5060		
	18,000		3420	3550	3680	3810	3940	4070	4180	4320	4500	4680	4890	5300		
	19,000		3490	3620	3760	3890	4030	4170	4290	4430	4670	5010	5410	5910		
	20,000		3660	3810	3960	4110	4280	4450	4600	4820	5130	5520	6010	6600		
	21,000		3990	4160	4330	4500	4680	4870	5030	5280	5650	6120	6690	7360		
	22,000		4340	4530	4710	4900	5110	5320	5500	5790	6200	6750	7440	8290		
	22,750		4610	4820	5020	5220	5450	5670	5870	6180	6640	7250	8030	8950		
	23,000		4720	4920	5130	5340	5570	5800	6000	6340	6830	7480	8280	9240		
	23,500		4920	5140	5350	5580	5820	6060	6290	6650	7150	7820	8750	9490		
2000	15,000		3360	3460	3570	3690	3800	3920	4050	4190	4340	4510	4690	4900		
	16,000		3400	3520	3640	3770	3890	4020	4150	4310	4470	4650	4850	5170		
	17,000		3470	3600	3720	3850	3980	4120	4260	4430	4600	4790	5000	5450		
	18,000		3540	3670	3810	3940	4080	4220	4370	4550	4730	4940	5250	5750		
	19,000		3610	3750	3890	4040	4180	4330	4490	4670	5000	5380	5840	6400		
	20,000		3790	3950	4110	4270	4440	4620	4830	5140	5520	5970	6520	7210		
	21,000		4140	4310	4490	4670	4860	5050	5290	5650	6100	6630	7240	8100		
	22,000		4510	4700	4890	5090	5310	5530	5790	6200	6740	7330	8150	8920		
	22,750		4790	5000	5220	5430	5660	5900	6190	6660	7240	7950	8880	9590		
	23,000		4900	5110	5330	5550	5790	6030	6330	6810	7410	8180	9020	9850		
	23,500		5110	5340	5570	5800	6050	6320	6630	7160	7800	8590	9390	10380		
3000	15,000		3450	3570	3690	3810	3930	4100	4240	4390	4560	4740	4950	5270		
	16,000		3510	3640	3770	3900	4030	4210	4350	4520	4700	4890	5170	5670		
	17,000		3590	3720	3850	3990	4130	4320	4470	4650	4840	5050	5430	5990		
	18,000		3660	3800	3940	4080	4230	4430	4600	4780	4990	5240	5720	6250		
	19,000		3740	3880	4030	4180	4330	4550	4720	5010	5380	5830	6380	7010		
	20,000		3920	4090	4250	4420	4600	4880	5160	5530	5970	6480	7120	7960		
	21,000		4280	4470	4650	4830	5030	5350	5670	6100	6610	7230	8000	8820		
	22,000		4670	4870	5070	5280	5500	5850	6220	6730	7330	8090	8950	9790		
	22,750		4960	5180	5400	5630	5870	6250	6660	7240	7930	8800	9530	10600		
	23,000		5080	5300	5530	5760	6010	6400	6830	7430	8150	8980	9790	10900		
	23,500		5300	5540	5780	6020	6290	6700	7150	7800	8530	9390	10310	11540		
4000	15,000		3560	3690	3810	3940	4070	4300	4450	4610	4790	5000	5230			
	16,000		3630	3760	3900	4030	4170	4410	4580	4750	4950	5170	5620			
	17,000		3710	3850	3990	4130	4270	4530	4710	4890	5110	5430	5990			
	18,000		3790	3930	4080	4230	4380	4660	4840	5040	5270	5700	6240			
	19,000		3870	4020	4180	4330	4490	4780	5020	5390	5820	6350	6990			
	20,000		4060	4230	4400	4580	4760	5160	5530	5970	6490	7110	7870			
	21,000		4430	4620	4820	5010	5220	5660	6090	6620	7230	7950	8840			
	22,000		4830	5040	5260	5480	5710	6210	6710	7340	8060	8910	9710			
	22,750		5150	5370	5610	5840	6090	6640	7210	7920	8740	9520	10510			
	23,000		5260	5500	5740	5980	6230	6790	7380	8140	9010	9750	10610			
	23,500		5490	5740	5990	6240	6530	7110	7790	8510	9550	10250	11430			
5,000	15,000		3700	3830	3970	4100	4250	4520	4680	4860	5060	5290	5760			
	16,000		3780	3920	4060	4200	4350	4650	4820	5010	5230	5590	6230			
	17,000		3850	4000	4150	4300	4470	4780	4960	5170	5410	5880	6550			
	18,000		3940	4090	4250	4410	4580	4910	5110	5330	5680	6210	6840			
	19,000		4030	4190	4350	4520	4700	5060	5420	5840	6370	6980	7760			
	20,000		4240	4420	4600	4780	5010	5570	5990	6500	7110	7820	8840			
	21,000		4630	4830	5030	5240	5490	6130	6630	7240	7910	8870	9670			
	22,000		5050	5280	5500	5730	6010	6760	7360	8060	8940	9710	10600			
	22,750		5380	5630	5870	6120	6420	7250	7920	8690	9540	10490	11750			
	23,000		5510	5760	6010	6260	6590	7430	8140	8980	9780	10790	12140			
	23,500		5760	6020	6290	6550	6870	7820	8580	9460	10280	11400	13090			
6,000	15,000		3850	3990	4130	4270	4440	4760	4930	5130	5360	5720				
	16,000		3930	4080	4220	4370	4550	4900	5080	5300	5620	6180				
	17,000		4010	4170	4320	4480	4670	5040	5240	5470	5880	6540				
	18,000		4100	4270	4430	4590	4790	5190	5410	5680	6190	6810				
	19,000		4190	4370	4540	4710	4920	5450	5850	6360	6930	7670				
	20,000		4410	4600	4790	4990	5250	6010	6500	7080	7820	8720				
	21,000		4830	5040	5250	5460	5760	6640	7220	7940	8740	9610				
	22,000		5270	5510	5740	5980	6310	7360	8050	8880	9700	10730				
	22,750		5620	5870	6130	6390	6740	7900	8670	9700	10450	11630				
	23,000		5750	6010	6270	6550	6920	8160	8950	9810	10750	12000				
	23,500		6010	6290	6560	6860	7250	8600	9500	10260	11340	12740				

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		4000	4140	4290	4440	4680	5020	5210	5420	5710	6290			
	16,000		4080	4240	4390	4550	4800	5170	5380	5610	6090	6730			
	17,000		4170	4330	4500	4670	4930	5330	5550	5860	6450	7120			
	18,000		4260	4440	4610	4790	5070	5490	5730	6190	6760	7500			
	19,000		4360	4540	4720	4910	5210	5900	6380	6930	7640	8510			
	20,000		4600	4800	5000	5210	5660	6570	7100	7800	8680	9470			
	21,000		5030	5250	5480	5710	6230	7270	7950	8790	9590	10600			
	22,000		5500	5740	6000	6260	6860	8090	8930	9730	10680	11920			
	22,750		5870	6130	6410	6700	7360	8790	9730	10470	11580				
	23,000		6010	6280	6550	6870	7530	9040	10000	10750	11910				
	23,500		6290	6580	6870	7180	7930	9520	10330	11340	12630				
8000	15,000		4150	4310	4460	4630	4940	5300	5510	5740	6140	6870			
	16,000		4240	4400	4570	4750	5080	5470	5690	6000	6570	7490			
	17,000		4340	4510	4680	4870	5220	5640	5880	6430	7020	7810			
	18,000		4430	4620	4800	4990	5370	5820	6200	6750	7420	8220			
	19,000		4540	4730	4920	5120	5530	6410	6960	7620	8380	9250			
	20,000		4770	4980	5190	5420	6090	7140	7800	8610	9420	10380			
	21,000		5220	5450	5690	5950	6720	7980	8760	9690	10500	11700			
	22,000		5710	5970	6230	6520	7420	8940	9910	10630	11770				
	22,750		6100	6390	6670	6980	7980	9730	10480	11510	12840				
	23,000		6250	6530	6840	7160	8230	9960	10770	11850					
	23,500		6540	6840	7140	7520	8650	10370	11330	12540					
9000	15,000		4320	4480	4640	4880	5220	5620	5850	6250	6770				
	16,000		4410	4580	4760	5010	5370	5810	6120	6690	7390				
	17,000		4510	4690	4870	5140	5530	6000	6360	7030	7720				
	18,000		4610	4800	5000	5280	5700	6320	6850	7520	8270				
	19,000		4720	4920	5120	5430	6040	7090	7740	8460	9370				
	20,000		4980	5210	5440	5870	6710	7950	8720	9720	10480				
	21,000		5470	5710	5970	6460	7460	8910	9900	10640	11790				
	22,000		5990	6260	6560	7120	8280	10060	10820	11920					
	22,750		6410	6700	7030	7640	8960	10680	11710	12980					
	23,000		6570	6880	7190	7860	9210	10990	12050	13400					
	23,500		6890	7210	7550	8230	9640	11560	12740						
10000	15,000		4490	4660	4830	5150	5530	5970	6270	6870	7490				
	16,000		4590	4760	4950	5290	5700	6180	6640	7370	8310				
	17,000		4690	4880	5080	5440	5880	6420	7030	7670	8590				
	18,000		4800	5000	5210	5600	6070	6910	7520	8270	9300				
	19,000		4910	5120	5340	5760	6590	7760	8500	9500	10300				
	20,000		5170	5400	5650	6310	7340	8760	9680	10510	11620				
	21,000		5670	5930	6210	6960	8160	9920	10700	11790	13220				
	22,000		6210	6510	6820	7680	9180	10900	11970	13300					
	22,750		6650	6980	7320	8270	9950	11780	13000						
	23,000		6830	7140	7490	8530	10260	12130	13420						
	23,500		7160	7490	7860	8960	10860	12800							
12,000	15,000		4890	5110	5370	5740	6190	6830	7550	8430					
	16,000		5010	5240	5510	5920	6400	7370	8120	9200					
	17,000		5130	5380	5670	6100	6620	7710	8400	9250					
	18,000		5250	5520	5830	6290	7140	8530	9370	10260					
	19,000		5380	5660	6120	6850	8060	9750	10540	11640					
	20,000		5780	6220	6800	7650	9060	10840	11900	13260					
	21,000		6360	6890	7570	8520	10230	12160	13470						
	22,000		7020	7610	8340	9550	11330	13710							
	22,750		7530	8210	9010	10320	12270								
	23,000		7700	8420	9360	10680	12640								
	23,500		8120	8860	9810	11230	13350								
14,000	15,000		5460	5700	6000	6460	7010	8330	9300	9890					
	16,000		5600	5860	6190	6680	7370	8910	9530	10390					
	17,000		5750	6030	6380	6900	7900	9560	10310	11280					
	18,000		5900	6210	6700	7630	8960	10770	11760	12980					
	19,000		6340	6850	7510	8580	10340	12220	13440						
	20,000		7040	7620	8420	9680	11490	13880							
	21,000		7810	8510	9370	11040	12900								
	22,000		8640	9540	10610	12140									
	22,750		9350	10330	11450	13160									
	23,000		9670	10660	11670	13570									
	23,500		10100	11270	12290	14360									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-41.

Figure 5-40

TAKEOFF FIELD LENGTH
FLAPS — 8°
Rudder Boost — OFF

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		3170	3260	3350	3440	3550	3660	3720	3820	3950	4090	4250	4430		
	16,000		3210	3300	3400	3510	3630	3750	3810	3910	4060	4210	4380	4580		
	17,000		3250	3360	3470	3590	3710	3840	3910	4010	4160	4330	4510	4760		
	18,000		3310	3430	3550	3670	3800	3930	4000	4120	4280	4450	4650	5020		
	19,000		3380	3500	3630	3760	3890	4030	4100	4220	4410	4720	5090	5550		
	20,000		3570	3720	3870	4020	4180	4340	4430	4590	4840	5200	5640	6190		
	21,000		3900	4060	4220	4390	4570	4750	4850	5030	5320	5740	6250	6890		
	22,000		4240	4420	4600	4780	4990	5190	5300	5500	5830	6330	6940	7650		
	22,750		4510	4710	4900	5100	5320	5540	5660	5880	6250	6780	7510	8370		
	23,000		4610	4810	5010	5220	5440	5670	5790	6010	6390	6990	7630	8570		
	23,100		4650	4850	5060	5260	5490	5720	5840	6060	6470	7060	7730	8640		
1000	15,000		3260	3350	3450	3560	3670	3780	3880	4000	4140	4290	4470	4660		
	16,000		3300	3400	3520	3630	3750	3880	3970	4100	4250	4420	4610	4870		
	17,000		3350	3470	3590	3720	3840	3970	4080	4210	4370	4550	4750	5150		
	18,000		3420	3550	3670	3800	3930	4070	4180	4320	4490	4680	4970	5420		
	19,000		3490	3620	3760	3890	4030	4170	4290	4450	4720	5060	5480	6000		
	20,000		3700	3860	4010	4160	4330	4500	4650	4880	5200	5600	6090	6730		
	21,000		4040	4210	4380	4550	4740	4930	5090	5360	5720	6200	6760	7540		
	22,000		4400	4590	4780	4970	5180	5390	5580	5880	6310	6850	7530	8450		
	22,750		4680	4880	5090	5300	5520	5760	5960	6300	6770	7380	8230	9270		
	23,000		4790	4990	5210	5420	5650	5890	6090	6440	6940	7570	8440	9200		
	23,100		4830	5040	5250	5470	5710	5940	6150	6520	7000	7670	8560	9290		
2000	15,000		3350	3450	3560	3680	3800	3920	4040	4190	4340	4510	4700	4920		
	16,000		3400	3520	3640	3760	3880	4010	4150	4310	4470	4650	4850	5290		
	17,000		3460	3590	3720	3850	3980	4110	4260	4430	4600	4790	5120	5570		
	18,000		3540	3670	3800	3940	4080	4220	4370	4550	4730	4940	5370	5880		
	19,000		3610	3750	3890	4030	4180	4330	4480	4730	5070	5460	5940	6510		
	20,000		3840	4000	4160	4320	4490	4670	4890	5210	5600	6060	6630	7350		
	21,000		4190	4370	4540	4720	4920	5120	5360	5730	6190	6740	7400	8240		
	22,000		4560	4760	4960	5160	5380	5600	5870	6300	6850	7490	8300	9060		
	22,750		4860	5070	5290	5510	5740	5980	6280	6760	7370	8130	8950	9770		
	23,000		4970	5190	5410	5630	5880	6120	6420	6920	7560	8290	9110	10040		
	23,100		5010	5230	5460	5680	5930	6170	6500	7020	7640	8410	9210	10150		
3000	15,000		3450	3560	3680	3800	3930	4100	4240	4400	4570	4750	4970	5440		
	16,000		3510	3630	3760	3890	4020	4200	4350	4520	4710	4910	5280	5820		
	17,000		3580	3710	3850	3980	4120	4310	4470	4650	4850	5100	5580	6240		
	18,000		3660	3790	3930	4080	4220	4430	4600	4790	5000	5380	5870	6500		
	19,000		3730	3880	4030	4180	4330	4540	4750	5080	5470	5950	6530	7260		
	20,000		3970	4140	4300	4470	4650	4940	5230	5610	6080	6650	7320	8220		
	21,000		4330	4520	4700	4890	5090	5420	5750	6190	6730	7410	8270	9030		
	22,000		4720	4930	5140	5340	5570	5940	6310	6840	7500	8260	9090	10080		
	22,750		5030	5260	5480	5710	5950	6350	6790	7380	8120	9050	9780	10980		
	23,000		5150	5370	5610	5840	6090	6510	6940	7570	8270	9190	10050	11390		
	23,100		5190	5420	5660	5890	6140	6570	7010	7650	8380	9260	10150	11550		
4000	15,000		3550	3680	3800	3930	4060	4290	4450	4620	4810	5030	5430			
	16,000		3620	3760	3890	4030	4160	4410	4580	4760	4970	5320	5860			
	17,000		3700	3840	3980	4120	4270	4530	4710	4910	5130	5580	6150			
	18,000		3780	3930	4070	4220	4380	4650	4840	5060	5370	5880	6480			
	19,000		3860	4020	4170	4330	4490	4780	5090	5480	5950	6500	7220			
	20,000		4110	4280	4450	4630	4820	5230	5620	6080	6630	7320	8100			
	21,000		4480	4680	4870	5070	5280	5750	6190	6740	7410	8240	9040			
	22,000		4890	5110	5320	5540	5770	6310	6820	7490	8220	9120	10060			
	22,750		5220	5450	5690	5920	6170	6760	7340	8040	8970	9770	10900			
	23,000		5330	5570	5810	6060	6310	6920	7520	8260	9290	10040	11240			
	23,100		5380	5620	5870	6110	6370	6980	7590	8360	9410	10140	11380			
5,000	15,000		3690	3820	3960	4090	4240	4510	4680	4870	5080	5400	5950			
	16,000		3770	3910	4050	4190	4350	4640	4820	5030	5250	5750	6360			
	17,000		3850	3990	4140	4290	4460	4770	4960	5190	5520	6130	6800			
	18,000		3930	4090	4240	4400	4580	4910	5120	5370	5830	6380	7090			
	19,000		4020	4180	4340	4510	4690	5110	5490	5950	6490	7140	7980			
	20,000		4290	4470	4650	4840	5060	5640	6080	6640	7270	8060	8880			
	21,000		4680	4880	5090	5300	5550	6210	6730	7400	8140	9010	9910			
	22,000		5110	5340	5570	5800	6080	6850	7490	8260	9170	9940	11090			
	22,750		5450	5700	5950	6190	6500	7360	8090	8970	9720	10760	12280			
	23,000		5580	5830	6080	6350	6660	7540	8310	9250	9990	11070	12830			
	23,100		5630	5880	6150	6400	6720	7600	8400	9270	10090	11190	13070			
6,000	15,000		3840	3980	4120	4250	4430	4750	4930	5140	5370	5860				
	16,000		3920	4060	4210	4360	4540	4880	5080	5320	5710	6320				
	17,000		4000	4160	4310	4470	4660	5030	5250	5530	6010	6630				
	18,000		4090	4260	4420	4580	4790	5180	5410	5830	6330	6960				
	19,000		4190	4360	4530	4700	4910	5500	5930	6480	7060	7850				
	20,000		4460	4650	4840	5030	5300	6080	6610	7220	7990	8870				
	21,000		4870	5090	5300	5520	5820	6740	7330	8070	9030	9770				
	22,000		5320	5560	5800	6040	6380	7440	8140	9010	9890	10930				
	22,750		5690	5950	6200	6460	6840	8010	8890	9750	10670	11900				
	23,000		5810	6080	6360	6620	7000	8220	9160	9990	10970	12260				
	23,100		5860	6140	6410	6680	7060	8300	9270	10100	11100	12420				

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		3980	4130	4280	4430	4660	5010	5210	5450	5900	6500			
	16,000		4070	4220	4380	4540	4790	5170	5390	5750	6320	7080			
	17,000		4160	4320	4490	4660	4920	5330	5560	6010	6690	7360			
	18,000		4250	4430	4600	4780	5060	5490	5800	6340	6970	7750			
	19,000		4350	4530	4710	4900	5200	5970	6500	7140	7840	8830			
	20,000		4640	4840	5040	5260	5720	6650	7230	7980	8940	9760			
	21,000		5080	5300	5530	5770	6290	7360	8120	8950	9840	10960			
	22,000		5560	5810	6060	6330	6940	8220	9080	9940	11000	12400			
	22,750		5930	6210	6480	6760	7440	8850	9950	10730	11950				
	23,000		6080	6350	6650	6950	7620	9110	10030	11040	12320				
	23,100		6130	6400	6700	7010	7690	9250	10120	11150	12460				
8000	15,000		4140	4290	4450	4620	4930	5300	5530	5880	6500	7350			
	16,000		4230	4390	4560	4730	5070	5470	5720	6270	6980	8130			
	17,000		4330	4500	4670	4860	5210	5650	6030	6650	7410	8100			
	18,000		4430	4610	4790	4980	5360	5830	6320	6930	7680	8680			
	19,000		4530	4720	4910	5110	5580	6490	7090	7850	8800	9660			
	20,000		4810	5020	5230	5470	6160	7250	7980	8810	9730	10900			
	21,000		5270	5500	5740	6000	6790	8110	8980	9830	10910	12500			
	22,000		5770	6030	6290	6590	7530	9020	9930	10940	12290				
	22,750		6170	6450	6730	7050	8080	9850	10690	11860	13490				
	23,000		6310	6600	6910	7240	8280	10180	10980	12240					
	23,100		6360	6670	6970	7300	8370	10300	11090	12370					
9000	15,000		4300	4460	4630	4860	5200	5620	5860	6410	7130				
	16,000		4400	4570	4740	5000	5360	5810	6160	6810	7800				
	17,000		4500	4680	4860	5130	5520	6000	6580	7180	8120				
	18,000		4600	4790	4980	5270	5690	6390	6990	7690	8630				
	19,000		4710	4910	5110	5410	6100	7190	7900	8780	9840				
	20,000		5030	5250	5490	5920	6770	8070	8940	9780	10850				
	21,000		5510	5760	6020	6510	7540	9070	9910	10920	12240				
	22,000		6040	6320	6610	7180	8320	10170	11010	12250					
	22,750		6460	6760	7090	7710	9000	10840	11940	13400					
	23,000		6630	6940	7260	7890	9260	11120	12290	13850					
	23,100		6690	7000	7320	8010	9360	11230	12430						
10000	15,000		4480	4640	4820	5140	5510	5960	6290	6990	7900				
	16,000		4570	4750	4940	5280	5680	6170	6830	7480	8760				
	17,000		4680	4870	5070	5430	5860	6520	7210	8020	8720				
	18,000		4790	4990	5190	5580	6040	6980	7640	8520	9370				
	19,000		4900	5110	5330	5760	6650	7860	8700	9580	10590				
	20,000		5210	5440	5690	6360	7400	8920	9920	10720	11990				
	21,000		5710	5970	6250	7020	8250	10040	10880	12090	13860				
	22,000		6260	6550	6870	7750	9210	11020	12170	13700					
	22,750		6710	7010	7370	8350	9950	11930	13280						
	23,000		6880	7200	7550	8560	10340	12290	13700						
	23,100		6940	7260	7610	8640	10480	12420	13870						
12,000	15,000		4880	5110	5370	5730	6180	6950	7710	8660					
	16,000		4990	5240	5520	5910	6390	7520	8230	9000					
	17,000		5110	5370	5680	6100	6610	7850	8690	9440					
	18,000		5240	5520	5840	6290	7200	8640	9590	10420					
	19,000		5370	5660	6120	6910	8130	9870	10660	11820					
	20,000		5820	6220	6770	7720	9110	10910	12040	13490					
	21,000		6400	6860	7520	8610	10280	12270	13650						
	22,000		7040	7580	8300	9540	11400	13810							
	22,750		7580	8120	9000	10480	12330								
	23,000		7760	8370	9240	10810	12680								
	23,100		7830	8440	9330	10770	12810								
14,000	15,000		5440	5690	5990	6450	7010	8510	9120	10280					
	16,000		5580	5850	6180	6660	7490	8890	9700	10720					
	17,000		5730	6020	6370	6890	7970	9580	10450	11550					
	18,000		5890	6200	6720	7680	9070	10830	11920	13320					
	19,000		6360	6900	7520	8650	10380	12280	13650						
	20,000		7070	7680	8420	9770	11530	13970							
	21,000		7860	8570	9440	11070	12960								
	22,000		8710	9530	10550	12180									
	22,750		9430	10250	11540	13200									
	23,000		9700	10600	11690	13600									
	23,100		9810	10760	11800	13740									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-41.

Figure 5-40.1

EFFECTIVITY
All

TAKEOFF FIELD LENGTH CORRECTION CHART
FLAPS — 8°
Rudder Boost — OFF

EXAMPLE:

1. Uncorrected Takeoff Field Length (from table) .....7,500 Ft (2,286 M)
2. Headwind ..... 20 Kt
3. Runway Gradient Reference Line
4. Runway Gradient..... -1.4% DN
5. Anti-Skid System Reference Line
6. Anti-Skid System .....ON
7. Anti-Ice System Reference Line
8. Anti-Ice System ..... OFF
9. APR and Autospoilers Reference Line
10. APR and Autospoilers System..... OFF
11. Altitude Reference Line
12. Altitude ..... 8,000 Ft
13. Corrected Takeoff Field Length ....7,920 Ft (2,414 M)

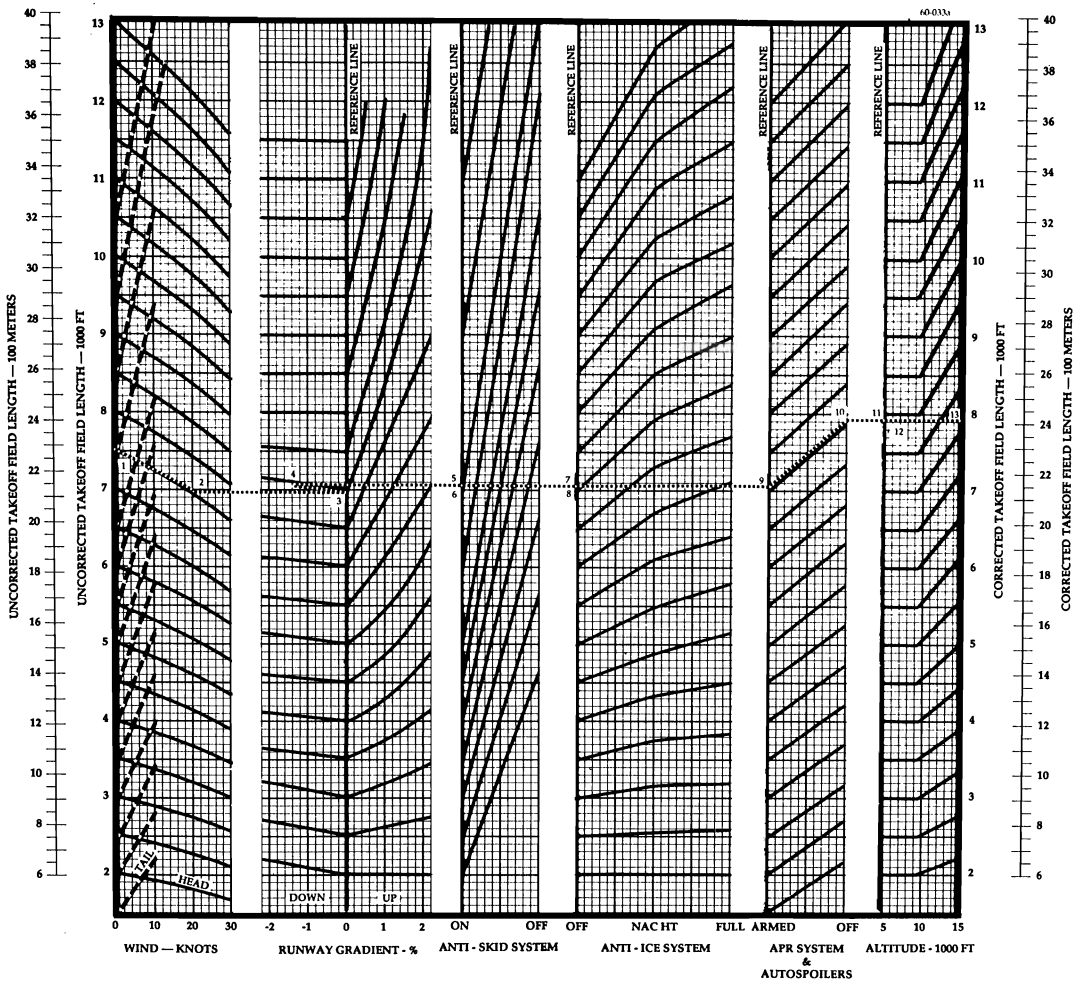


Figure 5-41

TAKEOFF SPEEDS
FLAPS — 8°
Rudder Boost — ON

EFFECTIVITY
All

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50	VR/V2 ~ KIAS VR	V2
		°F -40	-20	0	20	40	60	70	80	90	100	110	120				
SEA LEVEL	15,000	108	109	109	110	110	111	111	111	112	114	116	118			125	138
	16,000	111	111	111	112	112	113	113	113	113	115	117	119			125	138
	17,000	113	113	114	114	114	114	114	114	115	117	118	120			127	138
	18,000	116	116	116	116	117	117	117	117	117	118	120	121			130	138
	19,000	120	120	120	120	120	120	120	120	121	122	123	125			133	140
	20,000	123	124	123	123	124	124	124	124	124	125	127	129			136	143
	21,000	127	127	127	127	127	127	127	127	128	129	131	133			139	146
	22,000	131	130	131	130	130	130	131	130	131	133	135	137			142	149
	22,750	133	133	133	133	133	133	133	133	134	135	138	140			144	151
	23,000	134	134	134	134	134	134	134	134	134	137	138	141			144	152
	23,500	136	136	136	136	136	136	136	136	136	138	141	142			145	153
1000	15,000	109	109	110	110	111	111	111	112	113	115	117	119			125	138
	16,000	111	111	112	112	112	113	113	114	115	116	119	120			125	138
	17,000	113	114	114	114	114	114	114	115	116	118	120	122			127	138
	18,000	116	116	116	116	116	117	117	117	118	119	120	122			130	138
	19,000	120	120	120	120	120	120	120	120	121	122	124	126			133	140
	20,000	123	123	123	123	123	124	124	124	125	126	128	130			136	143
	21,000	127	127	127	127	127	127	127	127	128	130	132	136			139	146
	22,000	130	130	130	130	130	130	130	131	132	134	136	139			142	149
	22,750	133	133	133	133	133	133	133	133	135	136	139	141			144	151
	23,000	134	134	134	134	134	134	134	134	136	137	140	141			144	152
	23,500	136	136	136	135	135	135	135	136	137	140	142	143			145	153
2000	15,000	109	109	110	110	111	111	111	112	114	116	118	120			125	138
	16,000	111	111	112	112	112	113	113	114	116	118	119	122			125	138
	17,000	113	114	114	114	114	114	114	115	117	119	121	122			127	138
	18,000	116	116	116	116	116	117	117	117	119	120	121	123			130	138
	19,000	120	120	120	120	120	120	120	121	122	123	125	127			133	140
	20,000	123	123	123	123	123	123	124	124	126	127	129	132			136	143
	21,000	127	127	127	127	127	127	127	128	129	131	133	136			139	146
	22,000	130	130	130	130	130	130	130	131	133	135	138	139			142	149
	22,750	133	133	133	133	133	133	133	134	136	138	140	141			144	151
	23,000	134	134	134	134	134	134	133	135	137	139	141	142			144	152
	23,500	136	136	135	135	135	135	135	137	139	141	142	144			145	153
3000	15,000	109	110	110	110	111	111	112	114	116	118	119	122			125	138
	16,000	111	112	112	112	113	113	114	115	117	119	121	123			125	138
	17,000	114	114	114	114	114	114	115	117	118	120	122	125			127	138
	18,000	116	116	116	116	116	117	117	118	119	121	123	125			130	138
	19,000	120	120	120	120	120	120	120	121	123	124	126	129			133	140
	20,000	123	123	123	123	123	123	124	125	127	129	131	134			136	143
	21,000	127	127	127	127	127	127	127	129	130	133	135	137			139	146
	22,000	130	130	130	130	130	130	131	132	134	137	138	140			142	149
	22,750	133	133	133	132	133	133	134	135	137	140	141	143			144	151
	23,000	134	134	134	133	133	134	134	136	138	140	142	144			144	152
	23,500	135	135	135	135	135	135	136	138	140	141	143	145			145	153
4000	15,000	109	110	110	110	111	111	113	115	117	119	121				125	138
	16,000	111	112	112	112	112	113	115	117	119	121	123				125	138
	17,000	114	114	114	114	114	114	116	118	120	121	124				127	138
	18,000	116	116	116	116	116	117	118	119	120	122	124				130	138
	19,000	119	120	120	119	120	120	121	122	124	126	128				133	140
	20,000	123	123	123	123	123	123	125	126	128	130	132				136	143
	21,000	127	127	127	126	126	127	128	130	132	135	136				139	146
	22,000	130	130	130	130	130	130	132	134	136	138	140				142	149
	22,750	133	133	132	132	132	133	134	136	139	140	142				144	151
	23,000	134	133	133	133	133	134	135	137	140	141	143				145	152
	23,500	135	135	135	135	135	135	137	139	141	143	145				145	153
5000	15,000	109	110	110	110	111	113	114	116	118	121	123				125	138
	16,000	111	112	112	112	112	114	116	118	119	122	124				125	138
	17,000	114	114	114	114	114	115	117	119	121	123	126				127	138
	18,000	116	116	116	116	116	117	118	120	121	123	126				131	138
	19,000	120	120	120	120	120	121	122	123	125	127	130				134	141
	20,000	123	123	123	123	123	124	126	127	129	132	133				137	144
	21,000	127	127	127	126	126	128	129	131	134	136	137				139	147
	22,000	130	130	130	130	130	131	133	135	138	139	141				142	149
	22,750	133	133	132	132	132	134	136	138	139	141	144				144	151
	23,000	134	134	133	133	133	135	137	139	140	142	144				145	152
	23,500	135	135	135	135	135	137	138	141	142	144	146				146	153
6000	15,000	110	110	110	110	111	114	116	117	120	122					125	138
	16,000	112	112	112	112	112	115	117	119	121	124					125	138
	17,000	114	114	114	114	114	117	118	120	122	124					127	138
	18,000	116	116	116	116	116	118	119	121	122	124					131	138
	19,000	119	119	119	119	119	121	123	124	126	129					134	141
	20,000	123	123	123	123	123	125	127	128	131	133					137	144
	21,000	127	126	126	126	126	129	130	132	135	136					139	147
	22,000	130	130	130	130	130	132	134	136	138	140					142	149
	22,750	132	132	132	132	132	135	137	139	140	143					144	151
	23,000	133	133	133	133	133	136	138	140	141						145	152
	23,500	135	135	135	135	135	138	140	141	143						146	153

ABOVE LIMITS

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	VR/V2 ~ KIAS VR	V2
		°F -40	-20	0	20	40	60	70	80	90	100	110				
7000	15,000	109	110	110	110	111	115	116	119	121	124				125	138
	16,000	111	112	112	112	113	116	118	121	123	125				125	138
	17,000	113	113	113	113	114	117	119	121	124	126				128	138
	18,000	116	116	116	116	116	119	120	122	124	126				131	138
	19,000	119	119	119	119	120	122	124	126	128	131				134	141
	20,000	123	123	123	123	124	126	128	130	133	134				137	144
	21,000	126	126	126	126	127	130	132	134	136	138				140	147
	22,000	130	130	130	130	130	134	136	138	139					143	150
	22,750	132	132	132	132	133	136	139	140	142					144	152
	23,000	133	133	133	133	134	137	139	141						145	153
	23,500	135	135	135	134	136	140	141	142						146	154
8000	15,000	109	109	110	110	112	115	118	120	123	125				125	138
	16,000	111	111	111	111	114	117	119	122	125	125				125	138
	17,000	113	113	113	113	115	118	121	123	125	127				128	138
	18,000	115	115	115	115	117	119	121	123	125	128				131	138
	19,000	119	119	119	119	120	123	125	127	130	131				134	141
	20,000	123	123	123	122	124	127	129	131	133	136				137	144
	21,000	126	126	126	126	127	131	134	135	137	139				140	147
	22,000	130	129	129	129	131	135	137	139						143	150
	22,750	132	132	132	132	133	138	139	141						145	152
	23,000	133	133	133	133	134	139	140	142						145	153
	23,500	135	135	134	134	136	140	141							146	154
9000	15,000	109	109	109	110	113	117	119	122	124					125	138
	16,000	111	111	111	112	115	119	120	123	125					125	138
	17,000	113	113	113	114	116	119	122	123	127					128	138
	18,000	116	116	116	116	118	121	123	125	128					132	139
	19,000	119	119	119	120	122	125	127	130	131					135	142
	20,000	123	123	123	123	125	129	132	133	135					138	145
	21,000	126	126	126	127	129	133	135	137	139					141	148
	22,000	130	130	130	130	133	137	138	140						143	151
	22,750	132	132	132	133	135	139	141							145	153
	23,000	133	133	133	133	136	140	142							146	154
	23,500	135	135	135	135	138	141								147	155
10000	15,000	109	109	109	111	114	119	120	123	125					125	138
	16,000	111	111	111	113	116	119	122	124	125					125	138
	17,000	113	113	113	114	117	120	123	125	127					129	138
	18,000	115	115	115	116	119	122	124	126	128					132	139
	19,000	119	119	119	120	123	126	129	130	132					135	142
	20,000	123	123	122	124	127	131	133	134	136					138	145
	21,000	126	126	126	127	130	135	136	138	140					141	148
	22,000	129	129	129	130	134	137	139							143	151
	22,750	132	132	132	133	137	140								145	153
	23,000	133	133	132	134	138	141								146	154
	23,500	134	134	134	135	140	142								147	155
12,000	15,000	109	110	111	113	117	121	124	125						126	138
	16,000	111	112	113	115	118	123	125	126						126	138
	17,000	113	113	114	116	119	123	125	127						130	138
	18,000	116	117	117	119	122	126	128	129						133	140
	19,000	120	120	121	123	126	131	131	133						136	143
	20,000	123	124	125	127	130	134	135							139	146
	21,000	127	127	128	130	134	137								142	149
	22,000	130	131	132	134	137									145	152
	22,750	133	133	134	137	139									147	154
	23,000	134	134	135	138	140									147	155
	23,500	135	136	137	140	142									148	156
14,000	15,000	111	113	114	116	120	125	125	125						126	138
	16,000	113	114	115	118	121	124	126	128						128	138
	17,000	115	116	117	119	122	126	127	129						132	139
	18,000	119	120	121	123	127	130	132							135	142
	19,000	123	124	125	127	131	134								138	145
	20,000	127	128	129	131	134									141	149
	21,000	130	132	133	136	138									144	152
	22,000	134	135	136	138										147	155
	22,750	137	137	139	140										149	157
	23,000	138	138	139	141										150	158
	23,500	139	141	140											151	159

ABOVE LIMITS

NOTE:
- This table was prepared for zero runway gradient, anti-ice off & anti-skid on. For conditions other than these, apply the result from this table to the correction chart in Figure 5-43.
- The V1 determined from this figure must not exceed the VR determined from this figure. If V1 exceeds VR, reduce V1 to VR.

Figures in shaded area are above engine temperature limits and are provided for interpolation only.

Figure 5-42

EFFECTIVITY
All

TAKEOFF SPEEDS CORRECTION CHART
FLAPS — 8°
Rudder Boost — ON

EXAMPLE:

1. Uncorrected V1 . . . . . 122 KIAS
2. Runway Gradient Reference Line
3. Runway Gradient . . . . . -1.4% DN
4. Anti-Ice System Reference Line
5. Anti-Ice System . . . . . OFF
6. Anti-Skid System Reference Line
7. Anti-Skid System . . . . . ON
8. Corrected V1 . . . . . 119 KIAS

NOTE:

The V1 determined from this figure must not exceed VR. If V1 exceeds VR, reduce V1 to VR.

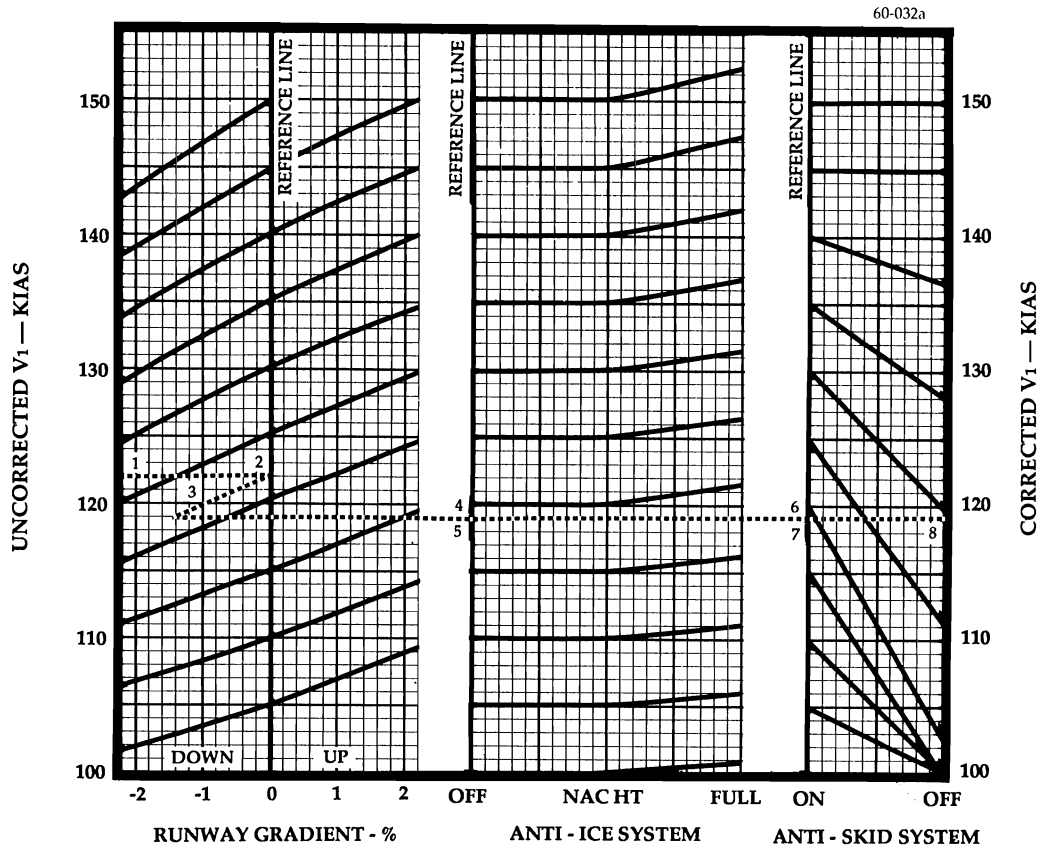


Figure 5-43

TAKEOFF SPEEDS
FLAPS — 8°
Rudder Boost — OFF

EFFECTIVITY
All

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50	VR/V2 ~ KIAS VR	V2
		°F -40	-20	0	20	40	60	70	80	90	100	110	120				
SEA LEVEL	15,000	123	123	123	123	123	122	122	122	122	121	121	120			125	138
	16,000	123	123	122	122	122	122	122	122	121	121	121	120			125	138
	17,000	122	122	122	122	122	122	122	121	121	121	120	120			127	138
	18,000	122	122	122	122	121	121	121	121	121	120	120	121			130	138
	19,000	122	121	121	121	121	121	121	121	121	122	123	125			133	140
	20,000	123	123	123	123	124	124	124	124	124	125	127	129			136	143
	21,000	127	127	127	127	127	127	127	127	128	129	131	133			139	146
	22,000	131	131	131	130	130	131	131	131	131	133	135	137			142	149
	22,750	133	133	133	133	133	133	133	133	134	135	138	140			144	151
	23,000	134	134	134	134	134	134	134	134	134	137	138	141			144	152
	23,500	136	136	136	136	136	136	136	136	136	138	141	142			145	153
1000	15,000	123	123	123	123	123	122	122	122	121	121	121	120	120		125	138
	16,000	123	122	122	122	122	122	122	121	121	121	120	120	120		125	138
	17,000	122	122	122	122	122	122	121	121	121	120	120	120	121		127	138
	18,000	122	122	122	121	121	121	121	121	121	120	120	120	122		130	138
	19,000	121	121	121	121	121	121	121	121	120	121	122	124	126		133	140
	20,000	123	123	123	123	124	124	124	124	125	126	128	130	130		136	143
	21,000	127	127	127	127	127	127	127	127	128	130	132	134	136		139	146
	22,000	131	131	130	130	130	130	130	131	132	134	136	139	139		142	149
	22,750	133	133	133	133	133	133	133	133	135	136	139	141	141		144	151
	23,000	134	134	134	134	134	134	134	134	136	137	140	142	141		144	152
	23,500	136	136	136	135	136	135	135	136	137	140	142	143	144		145	153
2000	15,000	123	123	123	123	122	122	122	121	121	121	120	120	120		125	138
	16,000	123	122	122	122	122	122	121	121	121	120	120	120	122		125	138
	17,000	122	122	122	122	122	121	121	121	120	120	121	122	122		127	138
	18,000	122	122	121	121	121	121	121	120	120	120	121	123	123		130	138
	19,000	121	121	121	121	121	121	120	121	122	123	125	127	127		133	140
	20,000	123	123	123	123	123	123	124	124	126	127	129	132	132		136	143
	21,000	127	127	127	127	127	127	127	128	129	131	133	136	136		139	146
	22,000	131	130	130	130	130	130	130	131	133	135	138	140	140		142	149
	22,750	133	133	133	133	133	133	133	134	136	138	140	141	141		144	151
	23,000	134	134	134	134	134	134	134	135	137	139	141	142	142		144	152
	23,500	136	136	135	135	135	135	135	137	139	141	142	144	144		145	153
3000	15,000	123	123	123	122	122	122	121	121	121	120	120	120	122		125	138
	16,000	122	122	122	122	122	121	121	121	120	120	120	121	123		125	138
	17,000	122	122	122	122	121	121	121	120	120	120	120	122	123		127	138
	18,000	122	122	121	121	121	121	121	120	120	120	121	123	125		130	138
	19,000	121	121	121	121	121	121	121	121	122	123	124	126	129		133	140
	20,000	123	123	123	123	123	123	124	125	127	129	131	134	134		136	143
	21,000	127	127	127	127	127	127	128	129	130	133	135	137	137		139	146
	22,000	130	130	130	130	130	131	132	134	137	138	140	140	140		142	149
	22,750	133	133	133	133	132	133	134	135	137	140	141	143	143		144	151
	23,000	134	134	134	133	133	134	134	136	138	140	142	144	144		144	152
	23,500	135	135	135	135	135	135	136	138	140	141	144	146	146		145	153
4000	15,000	123	123	122	122	122	122	121	121	120	120	120	121			125	138
	16,000	122	122	122	122	122	121	121	120	120	120	121	123			125	138
	17,000	122	122	122	122	121	121	120	120	120	120	122	124			127	138
	18,000	122	121	121	121	121	121	120	120	120	120	122	124			130	138
	19,000	121	121	121	121	121	120	121	122	124	126	128	128			133	140
	20,000	123	123	123	123	123	123	125	126	128	130	132	132			136	143
	21,000	127	127	127	126	126	127	128	130	132	135	136	136			139	146
	22,000	130	130	130	130	130	130	132	134	136	138	140	140			142	149
	22,750	133	133	133	132	132	133	134	136	139	140	142	142			144	151
	23,000	134	134	133	133	133	134	135	137	140	141	143	143			145	152
	23,500	135	135	135	135	135	135	137	140	141	143	145	145			145	153
5000	15,000	123	122	122	122	122	121	121	120	120	121	123				125	138
	16,000	122	122	122	122	122	121	120	120	120	122	124				125	138
	17,000	122	122	122	121	121	121	120	120	120	123	126				127	138
	18,000	121	121	121	121	121	120	120	120	121	123	126				131	138
	19,000	121	121	121	121	121	121	122	123	125	127	130				134	141
	20,000	123	123	123	123	123	124	126	127	129	132	134				137	144
	21,000	127	127	127	127	126	128	129	131	134	136	137				139	147
	22,000	130	130	130	130	130	131	133	135	138	139	141				142	149
	22,750	133	133	132	132	132	134	136	138	139	141	144				144	151
	23,000	134	133	133	133	133	135	137	139	140	142	144				145	152
	23,500	135	135	135	135	135	137	138	141	142	144	148				146	153
6000	15,000	123	122	122	122	122	121	121	120	120	122					125	138
	16,000	122	122	122	122	121	121	120	120	121	124					125	138
	17,000	122	122	121	121	121	120	120	120	122	124					127	138
	18,000	121	121	121	121	121	120	120	121	122	124					131	138
	19,000	121	121	121	121	120	121	123	125	126	129	ABOVE				134	141
	20,000	123	123	123	123	123	125	127	128	131	133	LIMITS				137	144
	21,000	127	126	126	126	126	129	130	132	135	136					139	147
	22,000	130	130	130	130	130	132	134	136	138	140					142	149
	22,750	133	132	132	132	132	135	137	139	140	143					144	151
	23,000	133	133	133	133	133	136	138	140	141	144					145	152
	23,500	135	135	135	135	135	138	140	141	143	146					146	153

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	VR/V2 ~ KIAS VR	V2
		°F -40	-20	0	20	40	60	70	80	90	100	110				
7000	15,000	122	122	122	122	121	121	120	120	121	124				125	138
	16,000	122	122	122	122	121	120	120	121	123	125				125	138
	17,000	122	122	121	121	121	120	120	121	124	126				128	138
	18,000	121	121	121	121	120	120	120	122	124	126				131	138
	19,000	121	121	121	121	120	122	124	126	128	131				134	141
	20,000	123	123	123	123	124	126	128	130	133	134				137	144
	21,000	127	126	126	126	127	130	132	134	136	138				140	147
	22,000	130	130	130	130	131	134	136	138	139	142				143	150
	22,750	132	132	132	132	133	136	139	140	142					144	152
	23,000	133	133	133	133	134	137	139	141	143					145	153
	23,500	135	135	135	134	136	140	141	142	145					146	154
8000	15,000	122	122	122	122	121	120	120	121	123	125				125	138
	16,000	122	122	122	122	121	120	120	122	124	126				125	138
	17,000	122	121	121	121	120	120	121	123	125	127				128	138
	18,000	121	121	121	121	120	120	121	123	125	128				131	138
	19,000	121	121	121	121	120	123	125	127	130	131				134	141
	20,000	123	123	123	123	124	127	129	131	133	136				137	144
	21,000	126	126	126	126	127	131	134	135	137	139				140	147
	22,000	130	130	129	129	131	135	137	139	141					143	150
	22,750	132	132	132	132	134	138	139	141	144					145	152
	23,000	133	133	133	133	134	139	140	142						145	153
	23,500	135	135	134	134	136	140	141	144						146	154
9000	15,000	122	122	122	122	121	120	120	122	124					125	138
	16,000	122	122	122	121	120	120	120	123	126					125	138
	17,000	122	121	121	121	120	120	122	123	127					128	138
	18,000	121	121	121	121	120	121	123	125	128					132	139
	19,000	121	121	121	120	122	125	127	130	131					135	142
	20,000	123	123	123	123	126	129	132	133	135					138	145
	21,000	127	126	126	127	129	133	135	137	139					141	148
	22,000	130	130	130	130	133	137	138	140						143	151
	22,750	132	132	132	133	135	139	141	143						145	153
	23,000	133	133	133	133	136	140	142	144						146	154
	23,500	135	135	135	135	138	141	143							147	155
10000	15,000	122	122	122	121	120	120	120	123	125					125	138
	16,000	122	122	122	121	120	120	122	124	125					125	138
	17,000	121	121	121	121	120	120	123	126	127					129	138
	18,000	121	121	121	120	120	122	124	126	128					132	139
	19,000	121	121	121	120	123	126	129	130	132					135	142
	20,000	123	123	123	124	127	131	133	134	136					138	145
	21,000	126	126	126	127	130	135	136	138	140					141	148
	22,000	129	129	129	131	134	137	139	142						143	151
	22,750	132	132	132	133	137	140	142							145	153
	23,000	133	133	132	134	138	141	143							146	154
	23,500	134	134	134	135	140	142								147	155
12,000	15,000	122	122	121	121	120	121	124	125						126	138
	16,000	122	121	121	120	120	123	125	126						126	138
	17,000	121	121	121	120	119	123	125	127						130	138
	18,000	121	121	120	120	122	126	128	129						133	140
	19,000	121	120	121	123	126	131	131	133						136	143
	20,000	123	124	125	127	130	134	135	138						139	146
	21,000	127	127	128	131	134	137	139							142	149
	22,000	130	131	132	134	137	141								145	152
	22,750	133	133	134	137	139									147	154
	23,000	134	134	135	138	140									147	155
	23,500	135	136	137	140	142									148	156
14,000	15,000	121	121	121	120	120	125	125	125						126	138
	16,000	121	121	120	120	121	124	126	128						128	138
	17,000	121	120	120	120	122	126	127	129						132	139
	18,000	120	120	121	123	127	130	132	134						135	142
	19,000	123	124	125	127	131	134	136		ABOVE					138	145
	20,000	127	128	129	131	134	138			LIMITS					141	149
	21,000	130	132	133	136	138									144	152
	22,000	134	135	136	138										147	155
	22,750	137	137	139	140										149	157
	23,000	138	138	139	141										150	158
	23,500	139	141	140	142										151	159

NOTE:
- This table was prepared for zero runway gradient & anti-ice off. For conditions other than these, apply the result from this table to the correction chart in Figure 5-45.
- The V1 determined from this figure must not exceed the VR determined from this figure. If V1 exceeds VR, reduce V1 to VR.

Figures in shaded area are above engine temperature limits and are provided for interpolation only.

Figure 5-44

EFFECTIVITY
All

TAKEOFF SPEEDS CORRECTION CHART
FLAPS — 8°
Rudder Boost — OFF

EXAMPLE:

1. Uncorrected V1 ..... 122 KIAS
2. Runway Gradient Reference Line
3. Runway Gradient ..... -1.4% DN
4. Anti-Ice System Reference Line
5. Anti-Ice System ..... OFF
6. Corrected V1 ..... 120 KIAS

NOTE:

The V1 determined from this figure must not exceed VR. If V1 exceeds VR, reduce V1 to VR.

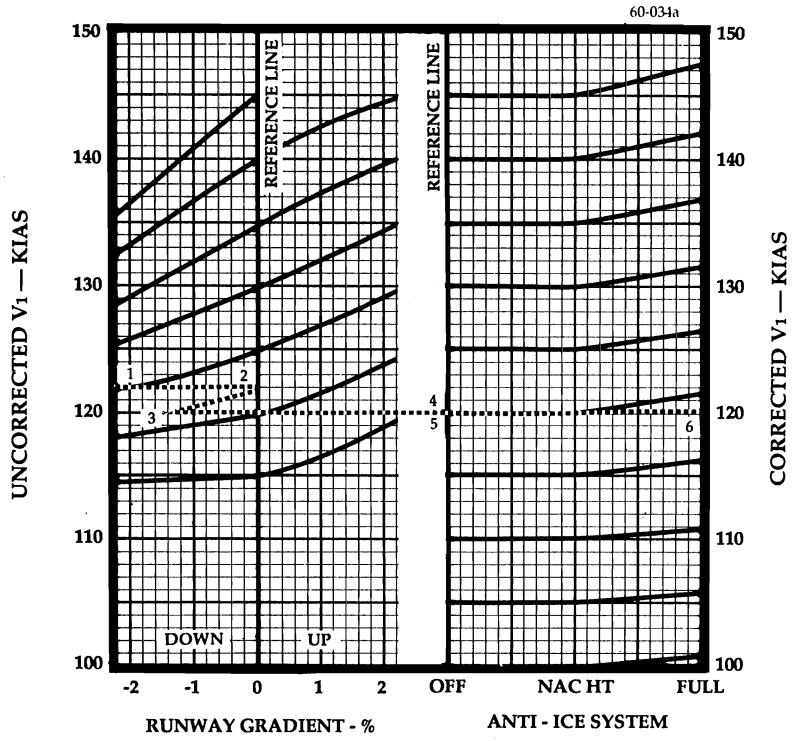


Figure 5-45

UNCORRECTED FIRST SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C / °F											
		°C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		13.5	13.5	13.5	13.5	13.4	13.3	13.2	13.1	12.7	11.3	10.0	8.6		
	16,000		12.1	12.0	12.0	12.0	11.9	11.8	11.7	11.7	11.3	10.0	8.7	7.5		
	17,000		10.7	10.7	10.7	10.7	10.6	10.5	10.4	10.4	10.0	8.8	7.6	6.4		
	18,000		9.5	9.5	9.5	9.5	9.4	9.3	9.3	9 2	8.8	7.7	6.6	5.5		
	19,000		8.3	8.3	8.3	8.3	8.2	8.1	8.1	8 0	7.7	6.6	5.6	4.5		
	20,000		7.2	7.2	7.2	7.2	7.1	7.1	7.0	7 0	6.6	5.6	4.6	3.7		
	21,000		6.3	6.3	6.3	6.2	6.2	6.1	6.0	6.0	5.7	4.7	3.8	2.9		
	22,000		5.4	5.4	5.4	5.4	5.3	5.2	5.2	5.1	4.8	3.9	3.1	2.2		
	22,750		4.8	4.8	4.8	4.8	4.7	4.6	4.6	4.5	4.3	3.4	2.5	1.7		
	23,000		4.6	4.6	4.6	4.6	4.5	4.4	4.4	4.4	4.1	3.2	2.4	1.5		
	23,500		4.2	4.2	4.2	4.2	4.1	4.1	4.0	4.0	3.7	2.9	2.0	1.2		
2000	15,000		13.4	13.4	13.3	13.3	13.2	13.1	13.0	12.1	10.9	9.6	8.3	7.1		
	16,000		11.9	11.9	11.9	11.9	11.8	11.6	11.6	10.8	9.6	8.4	7.2	6.0		
	17,000		10.6	10.6	10 6	10.6	10 5	10.4	10.3	9.5	8.4	7.3	6.2	5.1		
	18,000		9.4	9.4	9.4	9.4	9.3	9.2	9.1	8.4	7.4	6.3	5.3	4.2		
	19,000		8.2	8.2	8.2	8.2	8.1	8.0	8.0	7.3	6.3	5.3	4.3	3.3		
	20,000		7.1	7.1	7.1	7.1	7.0	6.9	6.9	6.2	5.3	4.4	3.4	2.5		
	21,000		6.2	6.2	6.1	6.1	6.1	6.0	5.9	5.3	4.4	3.5	2.7	1.8		
	22,000		5.3	5.3	5.3	5.3	5.2	5.1	5.1	4.5	3.6	2.8	2.0	1.1		
	22,750		4.7	4.7	4.7	4.7	4.6	4.5	4.5	3.9	3.1	2.3	1.5	0.7		
	23,000		4.5	4.5	4.5	4.5	4.4	4.3	4.3	3.7	2.9	2.1	1 3	0.5		
	23,500		4.1	4.1	4.1	4.1	4.0	4.0	3.9	3.4	2.6	1.8	1.0	0.3		
4000	15,000		13.4	13.3	13.3	13.3	13.2	13.0	11.6	10.2	9.0	7.8	6.6			
	16,000		11.9	11.9	11.9	11.8	11.7	11.5	10.3	9.0	7.8	6.7	5.5			
	17,000		10.6	10.6	10.6	10.5	10.4	10.3	9.0	7.8	6.8	5.7	4.5			
	18,000		9.4	9.4	9.4	9.4	9.2	9.1	8.0	6.8	5.8	4.8	3.5			
	19,000		8.2	8.2	8.2	8.2	8.1	7.9	6.8	5.8	4.8	3.9	2.9			
	20,000		7.1	7.1	7.1	7.1	7.0	6.8	5.8	4.8	3.9	3.0	2.1			
	21,000		6.2	6.1	6.1	6.1	6.0	5.9	4.9	4.0	3.1	2.3	1.4			
	22,000		5.3	5.3	5.3	5.2	5.2	5.0	4.1	3.2	2.4	1.6	0.8			
	22,750		4.7	4.7	4.7	4.6	4.6	4.4	3.6	2.7	1.9	1.1	0.4			
	23,000		4.5	4.5	4.5	4.4	4.4	4.2	3.4	2.5	1.7	1.0	0.2			
	23,500		4.1	4.1	4.1	4.1	4.0	3.9	3.0	2.2	1.4	0.7	0.0			
6000	15,000		13.1	13.1	13.1	13.0	13.0	10.9	9.7	8.5	7.3	6.1				
	16,000		11.7	11.7	11.6	11.6	11.6	9.6	8.5	7.3	6.2	5.1				
	17,000		10.4	10.4	10.3	10.3	10.3	8.5	7.4	6.3	5.3	4.2				
	18,000		9.2	9.2	9.2	9.2	9.1	7.4	6.4	5.4	4.4	3.4				
	19,000		8.0	8.0	8.0	8.0	7.9	6.3	5.4	4.4	3.5	2.5				
	20,000		6.9	6.9	6.9	6.9	6.9	5.3	4.4	3.5	2.7	1.8				
	21,000		6.0	6.0	6.0	6.0	5.9	4.4	3.6	2.8	1.9	1.1				
	22,000		5.1	5.1	5.1	5.1	5.1	3.7	2.9	2.1	1.3	0.5				
	22,750		4.5	4.5	4.5	4.5	4.5	3.1	2.3	1.6	0.8	0.0				
	23,000		4.3	4.3	4.3	4.3	4.3	2.9	2.2	1.4	0.7	-0.1				
	23,500		4.0	4.0	4.0	3.9	3.9	2.6	1.9	1.1	0.4	-0.4				
8000	15,000		13.1	13.1	13.1	13.1	11.6	9.0	7.9	6.8	5.7	4.6				
	16,000		11.7	11.7	11.7	11.6	10.3	7.8	6.8	5.8	4.8	3.7				
	17,000		10.4	10.4	10.4	10.3	9.1	6.8	5.8	4.9	3.9	2.8				
	18,000		9.2	9.2	9.2	9.2	8.0	5.8	4.9	4.0	3.1	2.2				
	19,000		8.0	8.0	8.0	8.0	6.9	4.8	4.0	3.1	2.2	1.4				
	20,000		6.9	6.9	6.9	6.9	5.8	3.9	3.1	2.3	1.5	0.7				
	21,000		6.0	6.0	5.9	5.9	4.9	3.1	2.3	1.6	0.8	0.1				
	22,000		5.1	5.1	5.1	5.1	4.1	2.4	1.7	0.9	0.2	-0.5				
	22,750		4.5	4.5	4.5	4.5	3.6	1.9	1.2	0.5	-0.2	-0.9				
	23,000		4.3	4.3	4.3	4.3	3.4	1.7	1.0	0.4	-0.3					
	23,500		3.9	3.9	3.9	3.9	3.0	1.4	0.8	0.1	-0.6					
10000	15,000		13.2	13.2	13.2	12.0	9.6	7.4	6.3	5.2	4.1					
	16,000		11.8	11.7	11.7	10.6	8.4	6.4	5.3	4.3	3.3					
	17,000		10.5	10.4	10.4	9.4	7.4	5.4	4.4	3.5	2.5					
	18,000		9.2	9.2	9.2	8.2	6.3	4.5	3.6	2.7	1.8					
	19,000		8.0	8.0	8.0	7.1	5.3	3.6	2.7	1.9	1.0					
	20,000		6.9	6.9	6.9	6.1	4.4	2.7	1.9	1.1	0.3					
	21,000		6.0	6.0	5.9	5.2	3.5	2.0	1.2	0.5	-0.3					
	22,000		5.1	5.1	5.1	4.3	2.8	1.3	0.6	-0.1	-0.8					
	22,750		4.5	4.5	4.5	3.8	2.3	0.9	0.2	-0.5						
	23,000		4.3	4.3	4.3	3.6	2.1	0.7	0.0	-0.6						
	23,500		3.9	3.9	3.9	3.2	1.8	0.5	-0.2							
12000	15,000		12.8	11.9	10.9	9.9	7.7	5.6	4.7	3.7						
	16,000		11.4	10.5	9.6	8.7	6.7	4.7	3.8	2.8						
	17,000		10.1	9.3	8.5	7.6	5.7	3.9	3.0	2.1						
	18,000		8.9	8.1	7.3	6.5	4.7	3.0	2.2	1.3						
	19,000		7.7	6.9	6.2	5.5	3.8	2.1	1.4	0.6						
	20,000		6.6	5.9	5.2	4.5	2.9	1.4	0.7	0.0						
	21,000		5.7	5.0	4.4	3.7	2.2	0.7	0.0	-0.8						
	22,000		4.8	4.2	3.6	2.9	1.5	0.1	-0.5							
	22,750		4.2	3.6	3.0	2.4	1.0	-0.3	-0.9							
	23,000		4.1	3.5	2.9	2.3	0.9	-0.4								
	23,500		3.7	3.1	2.5	1.9	0.6	-0.7								
14000	15,000		11.0	10.1	9.3	7.9	6.1	4.2	3.3	2.3						
	16,000		9.7	8.9	8.1	6.9	5.1	3.3	2.5	1.6						
	17,000		8.5	7.7	7.0	5.8	4.2	2.5	1.7	0.8						
	18,000		7.3	6.6	5.9	4.8	3.2	1.7	0.9	0.1						
	19,000		6.2	5.6	4.9	3.8	2.4	0.9	0.2	-0.5						
	20,000		5.3	4.6	4.0	3.0	1.6	0.3	-0.4	-1.1						
	21,000		4.4	3.8	3.2	2.3	0.9	-0.3	-1.0							
	22,000		3.7	3.1	2.5	1.6	0.3	-0.9								
	22,750		3.1	2.6	2.0	1.1	-0.1	-1.3								
	23,000		3.0	2.4	1.9	1.0	-0.2									
	23,500		2.7	2.1	1.6	0.7	-0.5									

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... DOWN
- Flaps ..... 8°
- Speed ..... VLOF

FIRST SEGMENT CLIMB GRADIENT
FLAPS — 8°

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

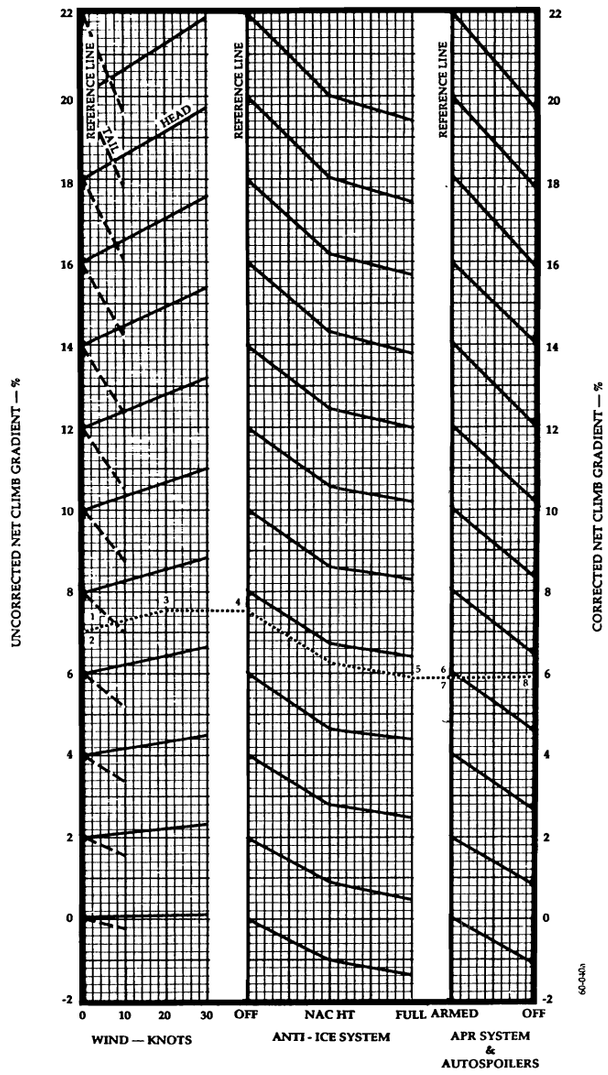


Figure 5-46

UNCORRECTED FIRST SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	13.1	13.0	13.0	13.0	12.9	12.7	12.7	12.6	12.2	10.9	9.6	8.3		
	16,000	11.6	11.6	11.6	11.6	11.4	11.3	11.3	11.2	10.8	9.6	8.4	7.1		
	17,000	10.3	10.3	10.3	10.3	10.2	10.1	10.0	9.9	9.6	8.4	7.3	6.1		
	18,000	9.1	9.1	9.1	9.1	9.0	8.9	8.8	8.8	8.4	7.4	6.3	5.2		
	19,000	8.0	8.0	7.9	7.9	7.8	7.7	7.7	7.6	7.3	6.3	5.3	4.3		
	20,000	6.9	6.9	6.9	6.9	6.8	6.7	6.7	6.6	6.3	5.3	4.4	3.4		
	21,000	6.0	5.9	5.9	5.9	5.8	5.8	5.7	5.7	5.3	4.4	3.5	2.6		
	22,000	5.1	5.1	5.1	5.1	5.0	4.9	4.9	4.8	4.5	3.6	2.8	1.9		
	22,750	4.5	4.5	4.5	4.5	4.4	4.3	4.3	4.2	3.9	3.1	2.3	1.5		
	23,000	4.3	4.3	4.3	4.3	4.2	4.1	4.1	4.1	3.7	2.9	2.1	1.3		
	23,100	4.2	4.2	4.2	4.2	4.1	4.1	4.0	4.0	3.7	2.9	2.0	1.2		
2000	15,000	12.9	12.9	12.9	12.9	12.7	12.6	12.6	11.7	10.4	9.2	8.0	6.7		
	16,000	11.5	11.5	11.4	11.4	11.3	11.2	11.2	10.4	9.2	8.0	6.9	5.7		
	17,000	10.2	10.2	10.2	10.2	10.1	10.0	9.9	9.2	8.1	7.0	5.9	4.8		
	18,000	9.0	9.0	9.0	9.0	8.9	8.8	8.8	8.0	7.0	6.0	5.0	3.9		
	19,000	7.9	7.9	7.8	7.8	7.8	7.7	7.6	6.9	6.0	5.0	4.0	3.1		
	20,000	6.8	6.8	6.8	6.8	6.7	6.6	6.6	5.9	5.0	4.1	3.2	2.3		
	21,000	5.9	5.9	5.8	5.8	5.8	5.7	5.7	5.0	4.2	3.3	2.4	1.6		
	22,000	5.0	5.0	5.0	5.0	4.9	4.8	4.8	4.2	3.4	2.6	1.7	0.9		
	22,750	4.4	4.4	4.4	4.4	4.3	4.3	4.2	3.6	2.9	2.1	1.3	0.5		
	23,000	4.2	4.2	4.2	4.2	4.1	4.1	4.0	3.5	2.7	1.9	1.1	0.3		
	23,100	4.2	4.2	4.1	4.1	4.1	4.0	4.0	3.4	2.6	1.8	1.1	0.3		
4000	15,000	12.9	12.9	12.9	12.8	12.8	12.4	11.1	9.8	8.5	7.3	6.1			
	16,000	11.5	11.5	11.4	11.4	11.4	11.0	9.8	8.6	7.4	6.3	5.1			
	17,000	10.2	10.2	10.2	10.1	10.1	9.8	8.6	7.5	6.4	5.3	4.2			
	18,000	9.0	9.0	9.0	9.0	8.9	8.6	7.6	6.5	5.4	4.4	3.4			
	19,000	7.9	7.9	7.8	7.8	7.8	7.5	6.5	5.5	4.5	3.5	2.6			
	20,000	6.8	6.8	6.8	6.8	6.7	6.5	5.5	4.5	3.6	2.7	1.8			
	21,000	5.9	5.9	5.8	5.8	5.8	5.5	4.6	3.7	2.8	2.0	1.1			
	22,000	5.0	5.0	5.0	5.0	4.9	4.7	3.8	3.0	2.1	1.3	0.5			
	22,750	4.4	4.4	4.4	4.4	4.3	4.1	3.3	2.4	1.6	0.8	0.0			
	23,000	4.2	4.2	4.2	4.2	4.2	3.9	3.1	2.3	1.5	0.7	-0.1			
	23,100	4.2	4.1	4.1	4.1	4.1	3.8	3.0	2.2	1.4	0.6	-0.1			
6000	15,000	12.7	12.7	12.7	12.7	12.6	10.5	9.3	8.1	6.9	5.8				
	16,000	11.3	11.3	11.3	11.2	11.2	9.2	8.1	7.0	5.9	4.8				
	17,000	10.0	10.0	10.0	10.0	9.9	8.1	7.1	6.0	5.0	3.9				
	18,000	8.9	8.9	8.8	8.8	8.8	7.1	6.1	5.1	4.1	3.1				
	19,000	7.7	7.7	7.7	7.7	7.6	6.0	5.1	4.2	3.2	2.3				
	20,000	6.7	6.7	6.7	6.6	6.6	5.0	4.2	3.3	2.4	1.6				
	21,000	5.7	5.7	5.7	5.7	5.7	4.2	3.4	2.5	1.7	0.9				
	22,000	4.9	4.9	4.9	4.9	4.8	3.4	2.6	1.8	1.1	0.3				
	22,750	4.3	4.3	4.3	4.3	4.2	2.9	2.1	1.4	0.6	-0.1				
	23,000	4.1	4.1	4.1	4.1	4.1	2.7	2.0	1.2	0.5	-0.3				
	23,100	4.1	4.1	4.0	4.0	4.0	2.6	1.9	1.2	0.4	-0.3				
8000	15,000	12.8	12.8	12.8	12.7	11.3	8.8	7.6	6.4	5.2	4.0				
	16,000	11.4	11.4	11.3	11.3	10.0	7.7	6.5	5.4	4.3	3.1				
	17,000	10.1	10.1	10.1	10.1	8.8	6.6	5.6	4.5	3.4	2.4				
	18,000	8.9	8.9	8.9	8.9	7.7	5.7	4.7	3.7	2.7	1.7				
	19,000	7.8	7.8	7.7	7.7	6.6	4.7	3.8	2.8	1.9	0.9				
	20,000	6.7	6.7	6.7	6.7	5.6	3.8	2.9	2.0	1.1	0.2				
	21,000	5.8	5.8	5.7	5.7	4.7	3.0	2.2	1.3	0.5	-0.4				
	22,000	4.9	4.9	4.9	4.9	3.9	2.3	1.5	0.7	-0.1					
	22,750	4.3	4.3	4.3	4.3	3.4	1.8	1.0	0.3	-0.5					
	23,000	4.1	4.1	4.1	4.1	3.2	1.7	0.9	0.1	-0.6					
	23,100	4.1	4.1	4.1	4.0	3.1	1.6	0.8	0.1	-0.7					
10000	15,000	12.9	12.9	12.9	11.7	9.4	7.1	6.0	4.9	3.7					
	16,000	11.5	11.5	11.5	10.4	8.2	6.1	5.0	4.0	2.9					
	17,000	10.2	10.2	10.2	9.2	7.1	5.1	4.1	3.2	2.2					
	18,000	9.0	9.0	9.0	8.0	6.1	4.2	3.3	2.4	1.5					
	19,000	7.9	7.8	7.8	6.9	5.1	3.3	2.4	1.6	0.7					
	20,000	6.8	6.8	6.8	5.9	4.2	2.5	1.7	0.9	0.1					
	21,000	5.9	5.8	5.8	5.0	3.4	1.8	1.0	0.2	-0.5					
	22,000	5.0	5.0	5.0	4.2	2.6	1.1	0.4	-0.3						
	22,750	4.4	4.4	4.4	3.7	2.1	0.7	0.0	-0.7						
	23,000	4.2	4.2	4.2	3.5	2.0	0.6	-0.2							
	23,100	4.1	4.1	4.1	3.4	1.9	0.5	-0.2							
12000	15,000	12.6	12.1	11.3	9.7	7.6	5.5	4.5	3.4						
	16,000	11.2	10.7	10.0	8.5	6.5	4.6	3.6	2.6						
	17,000	9.9	9.5	8.8	7.4	5.6	3.7	2.8	1.8						
	18,000	8.7	8.3	7.8	6.3	4.6	2.9	2.0	1.2						
	19,000	7.5	7.2	6.5	5.3	3.7	2.1	1.2	0.4						
	20,000	6.5	6.2	5.6	4.4	2.9	1.3	0.6	-0.2						
	21,000	5.6	5.3	4.7	3.6	2.1	0.7	-0.1							
	22,000	4.7	4.5	3.9	2.9	1.5	0.1	-0.8							
	22,750	4.2	3.9	3.4	2.4	1.0	-0.3	-1.0							
	23,000	4.0	3.8	3.2	2.2	0.9	-0.5								
	23,100	3.9	3.7	3.1	2.1	0.8	-0.5								
14000	15,000	10.9	10.1	9.3	7.9	5.9	4.0	3.0	2.1						
	16,000	9.6	8.8	8.1	6.8	5.0	3.1	2.2	1.3						
	17,000	8.4	7.7	7.0	5.8	4.1	2.4	1.5	0.7						
	18,000	7.2	6.6	5.9	4.7	3.1	1.5	0.7	-0.1						
	19,000	6.2	5.5	4.9	3.8	2.3	0.8	0.0	-0.7						
	20,000	5.2	4.6	4.1	3.0	1.5	0.1	-0.6							
	21,000	4.4	3.8	3.3	2.2	0.9	-0.5	-1.1							
	22,000	3.6	3.1	2.6	1.6	0.3	-1.0								
	22,750	3.1	2.6	2.1	1.1	-0.1	-1.4								
	23,000	2.9	2.4	1.9	1.0	-0.3									
	23,100	2.9	2.4	1.9	0.9	-0.3									

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... DOWN
- Flaps ..... 8°
- Speed ..... VLOF

FIRST SEGMENT CLIMB GRADIENT
FLAPS — 8°

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

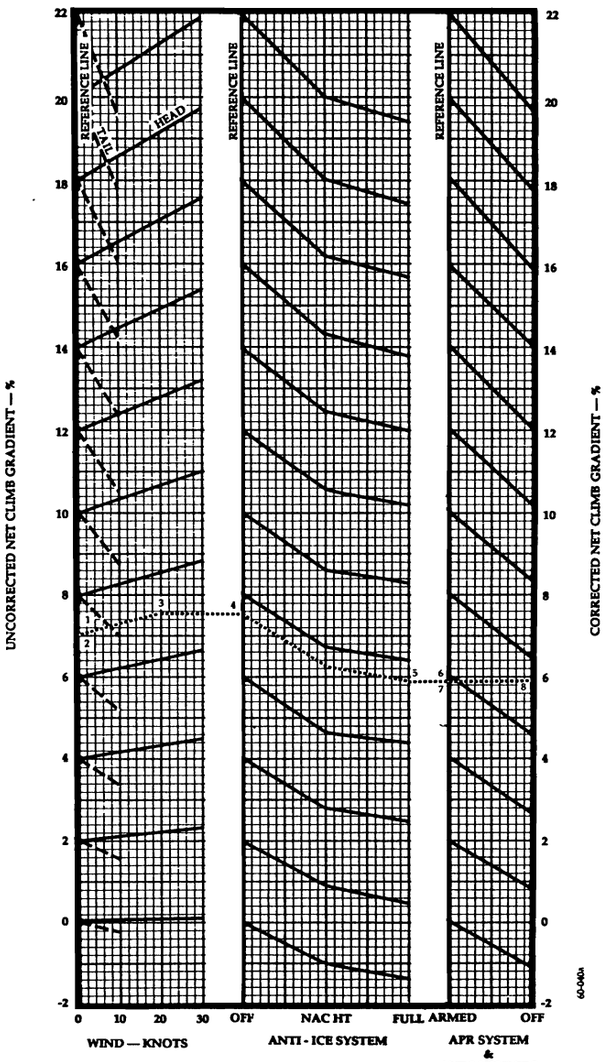


Figure 5-46.1

UNCORRECTED SECOND SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	16.4	16.4	16.3	16.3	16.2	16.1	16.0	15.5	14.7	13.3	12.0	10.7		
	16,000	14.7	14.7	14.7	14.7	14.5	14.4	14.4	13.9	13.1	11.9	10.6	9.4		
	17,000	13.2	13.2	13.2	13.2	13.1	13.0	12.9	12.5	11.7	10.6	9.4	8.2		
	18,000	11.9	11.9	11.8	11.8	11.7	11.6	11.6	11.2	10.5	9.4	8.3	7.2		
	19,000	10.6	10.6	10.6	10.6	10.5	10.4	10.4	10.0	9.3	8.3	7.2	6.2		
	20,000	9.5	9.5	9.5	9.5	9.4	9.3	9.3	8.9	8.3	7.3	6.3	5.4		
	21,000	8.5	8.5	8.5	8.5	8.4	8.3	8.3	7.9	7.3	6.4	5.5	4.6		
	22,000	7.6	7.6	7.6	7.6	7.5	7.4	7.4	7.1	6.5	5.6	4.7	3.9		
	22,750	7.0	7.0	7.0	7.0	6.9	6.8	6.8	6.5	5.9	5.1	4.2	3.4		
	23,000	6.8	6.8	6.8	6.8	6.7	6.6	6.6	6.3	5.7	4.9	4.1	3.2		
	23,500	6.4	6.4	6.4	6.4	6.3	6.2	6.2	5.9	5.4	4.5	3.7	2.9		
2000	15,000	16.3	16.3	16.3	16.2	16.1	15.9	15.2	14.0	12.8	11.5	10.3	9.0		
	16,000	14.6	14.6	14.6	14.6	14.5	14.3	13.6	12.5	11.4	10.2	9.0	7.9		
	17,000	13.2	13.1	13.1	13.1	13.0	12.8	12.2	11.2	10.1	9.0	7.9	6.8		
	18,000	11.8	11.8	11.8	11.8	11.6	11.5	10.9	10.0	8.9	7.9	6.9	5.8		
	19,000	10.6	10.5	10.5	10.5	10.4	10.3	9.7	8.8	7.9	6.9	5.9	4.9		
	20,000	9.5	9.4	9.4	9.4	9.3	9.2	8.7	7.8	6.9	6.0	5.1	4.2		
	21,000	8.5	8.4	8.4	8.4	8.3	8.2	7.7	6.9	6.0	5.2	4.3	3.4		
	22,000	7.6	7.5	7.5	7.5	7.4	7.3	6.8	6.1	5.2	4.4	3.6	2.8		
	22,750	6.9	6.9	6.9	6.9	6.8	6.7	6.2	5.5	4.7	3.9	3.1	2.3		
	23,000	6.7	6.7	6.7	6.7	6.6	6.5	6.1	5.3	4.5	3.8	3.0	2.2		
	23,500	6.4	6.3	6.3	6.3	6.2	6.1	5.7	5.0	4.2	3.4	2.7	1.9		
4000	15,000	16.2	16.1	16.1	16.1	16.0	14.8	13.5	12.2	10.9	9.7	8.5			
	16,000	14.5	14.5	14.5	14.4	14.3	13.3	12.0	10.8	9.7	8.5	7.4			
	17,000	13.0	13.0	13.0	13.0	12.9	11.9	10.7	9.6	8.5	7.4	6.4			
	18,000	11.7	11.7	11.7	11.6	11.6	10.6	9.5	8.4	7.4	6.4	5.4			
	19,000	10.5	10.4	10.4	10.4	10.3	9.4	8.4	7.4	6.4	5.5	4.6			
	20,000	9.4	9.3	9.3	9.3	9.2	8.4	7.4	6.5	5.6	4.7	3.8			
	21,000	8.4	8.3	8.3	8.3	8.3	7.4	6.5	5.6	4.8	3.9	3.1			
	22,000	7.5	7.4	7.4	7.4	7.4	6.6	5.7	4.9	4.0	3.2	2.4			
	22,750	6.8	6.8	6.8	6.8	6.7	6.0	5.2	4.3	3.6	2.8	2.0			
	23,000	6.6	6.6	6.6	6.6	6.6	5.8	5.0	4.2	3.4	2.6	1.9			
	23,500	6.3	6.3	6.2	6.2	6.2	5.4	4.6	3.8	3.1	2.3	1.8			
6000	15,000	16.1	16.0	16.0	16.0	15.2	12.8	11.6	10.4	9.3	8.1				
	16,000	14.4	14.4	14.4	14.3	13.6	11.4	10.3	9.2	8.1	7.0				
	17,000	12.9	12.9	12.9	12.9	12.2	10.1	9.1	8.1	7.0	6.0				
	18,000	11.6	11.6	11.6	11.5	10.9	8.9	8.0	7.0	6.1	5.1				
	19,000	10.4	10.4	10.3	10.3	9.7	7.9	7.0	6.1	5.2	4.3				
	20,000	9.3	9.3	9.2	9.2	8.7	6.9	6.0	5.2	4.3	3.5				
	21,000	8.3	8.3	8.2	8.2	7.7	6.0	5.2	4.4	3.6	2.8				
	22,000	7.4	7.4	7.4	7.3	6.8	5.3	4.5	3.7	3.0	2.2				
	22,750	6.8	6.8	6.7	6.7	6.2	4.7	4.0	3.2	2.5	1.8				
	23,000	6.6	6.6	6.5	6.5	6.1	4.5	3.8	3.1	2.4	1.6				
	23,500	6.2	6.2	6.2	6.1	5.7	4.2	3.5	2.8	2.1	1.4				
8000	15,000	16.1	16.1	16.0	15.4	13.5	11.0	9.9	8.8	7.7	6.6				
	16,000	14.4	14.4	14.4	13.8	12.0	9.7	8.7	7.7	6.6	5.6				
	17,000	13.0	12.9	12.9	12.4	10.7	8.6	7.6	6.6	5.6	4.7				
	18,000	11.6	11.6	11.6	11.1	9.5	7.5	6.6	5.7	4.7	3.8				
	19,000	10.4	10.4	10.3	9.9	8.4	6.5	5.6	4.8	3.9	3.1				
	20,000	9.3	9.3	9.2	8.8	7.4	5.6	4.8	4.0	3.2	2.4				
	21,000	8.3	8.3	8.2	7.8	6.5	4.8	4.0	3.3	2.5	1.8				
	22,000	7.4	7.4	7.3	7.0	5.7	4.1	3.4	2.6	1.9	1.2				
	22,750	6.8	6.7	6.7	6.4	5.1	3.6	2.9	2.2	1.5	0.8				
	23,000	6.6	6.5	6.5	6.2	5.0	3.4	2.7	2.1	1.4	0.7				
	23,500	6.2	6.2	6.2	5.8	4.6	3.1	2.5	1.8	1.1	0.4				
10000	15,000	15.9	15.4	14.9	13.8	11.5	9.3	8.3	7.2	6.2					
	16,000	14.3	13.8	13.3	12.3	10.2	8.1	7.2	6.2	5.2					
	17,000	12.8	12.4	11.9	11.0	9.0	7.1	6.1	5.2	4.3					
	18,000	11.5	11.1	10.7	9.8	7.9	6.1	5.2	4.4	3.5					
	19,000	10.2	9.9	9.5	8.6	6.9	5.2	4.4	3.6	2.7					
	20,000	9.1	8.8	8.4	7.6	6.0	4.4	3.6	2.8	2.1					
	21,000	8.2	7.8	7.5	6.7	5.1	3.6	2.9	2.2	1.5					
	22,000	7.3	6.9	6.6	5.9	4.4	3.0	2.3	1.6	0.9					
	22,750	6.7	6.3	6.0	5.4	3.9	2.5	1.9	1.2	0.5					
	23,000	6.5	6.1	5.8	5.2	3.7	2.4	1.7	1.1	0.4					
	23,500	6.1	5.8	5.5	4.8	3.4	2.1	1.5	0.8	0.2					
12000	15,000	14.8	13.8	12.9	11.7	9.7	7.7	6.7	5.7						
	16,000	13.2	12.4	11.5	10.4	8.5	6.6	5.7	4.8						
	17,000	11.8	11.0	10.2	9.2	7.4	5.6	4.8	3.9						
	18,000	10.5	9.8	9.0	8.1	6.4	4.7	3.9	3.1						
	19,000	9.4	8.7	8.0	7.0	5.5	3.9	3.2	2.4						
	20,000	8.3	7.7	7.0	6.1	4.6	3.2	2.5	1.8						
	21,000	7.4	6.8	6.1	5.3	3.9	2.5	1.8	1.2						
	22,000	6.6	6.0	5.4	4.6	3.2	1.9	1.3	0.6						
	22,750	6.0	5.4	4.8	4.1	2.8	1.5	0.9	0.3						
	23,000	5.8	5.2	4.6	3.9	2.6	1.4	0.8	0.2						
	23,500	5.5	4.9	4.3	3.6	2.3	1.1	0.5	-0.1						
14000	15,000	13.0	12.1	11.3	9.7	8.0	6.2	5.3	4.4						
	16,000	11.5	10.8	10.0	8.5	6.9	5.2	4.4	3.5						
	17,000	10.3	9.5	8.8	7.4	5.9	4.3	3.5	2.7						
	18,000	9.1	8.4	7.7	6.4	5.0	3.5	2.8	2.0						
	19,000	8.0	7.4	6.7	5.5	4.2	2.8	2.1	1.3						
	20,000	7.1	6.5	5.9	4.7	3.4	2.1	1.4	0.8						
	21,000	6.3	5.7	5.1	4.0	2.7	1.5	0.9	0.2						
	22,000	5.5	4.9	4.4	3.3	2.1	1.0	0.4	-0.2						
	22,750	5.0	4.4	3.9	2.8	1.7	0.6	0.0	-0.8						
	23,000	4.8	4.3	3.7	2.7	1.6	0.5	-0.1							
	23,500	4.5	4.0	3.4	2.4	1.3	0.2	-0.3							

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... UP
- Flaps ..... 8°
- Speed V2

SECOND SEGMENT CLIMB GRADIENT
FLAPS — 8°

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

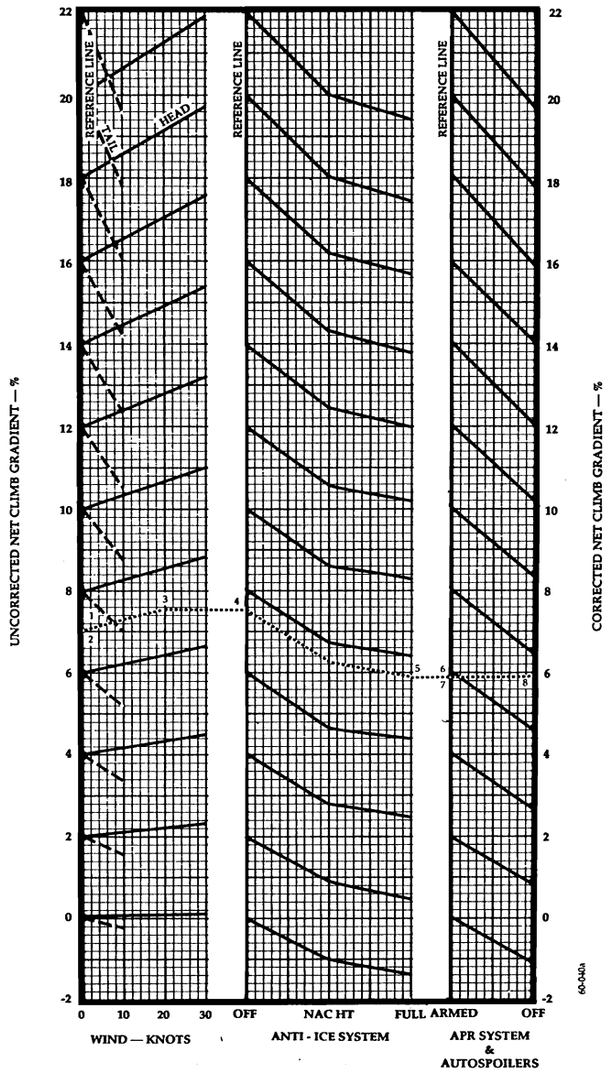


Figure 5-47

UNCORRECTED SECOND SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	15.9	15.9	15.9	15.8	15.7	15.6	15.5	15.1	14.2	12.9	11.6	10.3		
	16,000	14.3	14.3	14.2	14.2	14.1	14.0	13.9	13.5	12.7	11.5	10.3	9.1		
	17,000	12.8	12.8	12.8	12.8	12 6	12.5	12.5	12.1	11.3	10.2	9.1	7.9		
	18,000	11.5	11.5	11.4	11.4	11.3	11.2	11.2	10.8	10.1	9.0	8.0	6.9		
	19,000	10.3	10.2	10.2	10.2	10.1	10.0	10.0	9.6	8.9	7.9	6.9	6.0		
	20,000	9.2	9.2	9.1	9.1	9.0	9.0	8.9	8.6	7.9	7.0	6.0	5.1		
	21,000	8.2	8.2	8.2	8.2	8.1	8.0	8.0	7.6	7 0	6.1	5.2	4.3		
	22,000	7.3	7.3	7.3	7.3	7.2	7.1	7.1	6.8	6.2	5.3	4.5	3.6		
	22,750	6.7	6.7	6.7	6.7	6.6	6.5	6.5	6.2	5.6	4.8	4.0	3.2		
	23,000	6.5	6.5	6.5	6.5	6.4	6.3	6.3	6.0	5.4	4.6	3.8	3.0		
	23,100	6.4	6.4	6.4	6.4	6.3	6.2	6.2	5.9	5.3	4.5	3.7	3.0		
2000	15,000	15.8	15.8	15.8	15.8	15.7	15.4	14.7	13 6	12.3	11.1	9.8	8.6		
	16,000	14.2	14.2	14.2	14.1	14.1	13.8	13 2	12.1	11.0	9.8	8.6	7.4		
	17,000	12.7	12.7	12.7	12.7	12.6	12.4	11.8	10 8	9.7	8.6	7.5	6.4		
	18,000	11.4	11.4	11.4	11.4	11.3	11.1	10.5	9.6	8.6	7.5	6.5	5.5		
	19,000	10.2	10.2	10.2	10.2	10.1	9.9	9.4	8.5	7.5	6.5	5.6	4.6		
	20,000	9.1	9.1	9.1	9.1	9.0	8.8	8.3	7.5	6.6	5.7	4.7	3.8		
	21,000	8.1	8.1	8.1	8.1	8.0	7.9	7.4	6.6	5.7	4.9	4.0	3.1		
	22,000	7.3	7.3	7.2	7.2	7.2	7.0	6.5	5.8	5.0	4.1	3.3	2.5		
	22,750	6.7	6.6	6.6	6.6	6.6	6.4	6.0	5.2	4.4	3.6	2.8	2.1		
	23,000	6.5	6.4	6.4	6.4	6.4	6.2	5.8	5.1	4.3	3.5	2.7	1.9		
	23,100	6.4	6.4	6.4	6.3	6.3	6.1	5.7	5.0	4.2	3.4	2.6	1.9		
4000	15,000	15.7	15.7	15.7	15.6	15.6	14.3	13.1	11.8	10.6	9.3	8.1			
	16,000	14.1	14.1	14.1	14.0	14.0	12.8	11.6	10.4	9.3	8.2	7.0			
	17,000	12.7	12.6	12.6	12.6	12.5	11.4	10.3	9.2	8.2	7.1	6.0			
	18,000	11.3	11.3	11.3	11.3	11.2	10.2	9.2	8.1	7.1	6.1	5.1			
	19,000	10 1	10.1	10.1	10.1	10.0	9.1	8.1	7.1	6.1	5.2	4.2			
	20,000	9.1	9.0	9.0	9.0	9.0	8.0	7.1	6.2	5.3	4.4	3.5			
	21,000	8.1	8.1	8.1	8.0	8.0	7.1	6.2	5.4	4.5	3.7	2.8			
	22,000	7.2	7.2	7.2	7.2	7.1	6.3	5.4	4.6	3.8	3.0	2.2			
	22,750	6.6	6.6	6.6	6.6	6.5	5.7	4.9	4.1	3.3	2.5	1.8			
	23,000	6.4	6.4	6.4	6.4	6.3	5.5	4.7	3.9	3.2	2.4	1.6			
	23,100	6.3	6.3	6.3	6.3	6.2	5.4	4.7	3.9	3.1	2.3	1.6			
6000	15,000	15.7	15.6	15.6	15.6	14.8	12.5	11.3	10.1	8.9	7.6				
	16,000	14.1	14.0	14.0	14.0	13.3	11.1	10.0	8.8	7.7	6.6				
	17,000	12.6	12.6	12.6	12.5	11.9	9.9	8.8	7.7	6.7	5.6				
	18,000	11.3	11.3	11.3	11.2	10.6	8.7	7.7	6.7	5.7	4.7				
	19,000	10.1	10.1	10.1	10.0	9.5	7.7	6.7	5.8	4.8	3.9				
	20,000	9.0	9.0	9.0	9.0	8.4	6.7	5.8	4.9	4.0	3.1				
	21,000	8.0	8.0	8.0	8.0	7.5	5.9	5.0	4.2	3.3	2.5				
	22,000	7.2	7.2	7.1	7.1	6.6	5.1	4.3	3.5	2.7	1.9				
	22,750	6.6	6.6	6.5	6.5	6.0	4.6	3.8	3.0	2.2	1.5				
	23,000	6.4	6.4	6.3	6.3	5.9	4.4	3.6	2.9	2.1	1.3				
	23,100	6.3	6.3	6.3	6.3	5.8	4.3	3.6	2.8	2.0	1.3				
8000	15,000	15.8	15.8	15.7	15.1	13.2	10.8	9.6	8.4	7.2	6.1				
	16,000	14.2	14.1	14.1	13.5	11.7	9.5	8.4	7.3	6.2	5.1				
	17,000	12.7	12.7	12.7	12.1	10.4	8.3	7.3	6.3	5.2	4.2				
	18,000	11.4	11.4	11.3	10.8	9.3	7.3	6.3	5.3	4.4	3.4				
	19,000	10.2	10.2	10.1	9.7	8.2	6.3	5.4	4.5	3.6	2.7				
	20,000	9.1	9.1	9.1	8.6	7.2	5.4	4.6	3.7	2.8	2.0				
	21,000	8.1	8.1	8.1	7.7	6.3	4.7	3.8	3.0	2.2	1.4				
	22,000	7.2	7.2	7.2	6.8	5.5	4.0	3.2	2.4	1.6	0.8				
	22,750	6.6	6.6	6.6	6.2	5.0	3.5	2.7	2.0	1.2	0.5				
	23,000	6.4	6.4	6.4	6.0	4.8	3.3	2.6	1.8	1.1	0.3				
	23,100	6.3	6.3	6.3	5.9	4.7	3.2	2.5	1.8	1.0	0.3				
10000	15,000	15.7	15.4	15.0	13.6	11.3	9.1	8.0	6.9	5.8					
	16,000	14.0	13.8	13.4	12.1	10.0	7.9	6.9	5.9	4.9					
	17,000	12.6	12.4	12.0	10.8	8.8	6.9	5.9	5.0	4.0					
	18,000	11.3	11.1	10.7	9.6	7.7	5.9	5.0	4.1	3.2					
	19,000	10.1	9.9	9.5	8.5	6.7	5.0	4.2	3.3	2.5					
	20,000	9.0	8.8	8.5	7.5	5.8	4.2	3.4	2.6	1.8					
	21,000	8.0	7.9	7.6	6.6	5.0	3.5	2.7	2.0	1.2					
	22,000	7.2	7.0	6.7	5.8	4.3	2.8	2.1	1.4	0.7					
	22,750	6.6	6.4	6.1	5.2	3.8	2.4	1.7	1.0	0.3					
	23,000	6.4	6.2	5.9	5.1	3.6	2.3	1.6	0.9	0.2					
	23,100	6.3	6.2	5.9	5.0	3.6	2.2	1.5	0.8	0.2					
12000	15,000	14.6	13.9	13.1	11.6	9.5	7.5	6.5	5.5						
	16,000	13.0	12.4	11.7	10.3	8.3	6.4	5.5	4.6						
	17,000	11.7	11.1	10.4	9.1	7.3	5.5	4.6	3.7						
	18,000	10.4	9.9	9.2	8.0	6.3	4.6	3.8	2.9						
	19,000	9.3	8.8	8.1	7.0	5.4	3.8	3.0	2.2						
	20,000	8.2	7.8	7.2	6.1	4.5	3.1	2.3	1.6						
	21,000	7.3	6.9	6.3	5.2	3.8	2.4	1.7	1.0						
	22,000	6.5	6.1	5.6	4.5	3.2	1.8	1.1	0.5						
	22,750	5.9	5.6	5.0	4.0	2.7	1.4	0.8	0.1						
	23,000	5.7	5.4	4.8	3.9	2.6	1.3	0.6	0.0						
	23,100	5.7	5.3	4.8	3.8	2.5	1.2	0.6	0.0						
14000	15,000	12.9	11.9	11.1	9.7	7.8	6.0	5.0	4.1						
	16,000	11.5	10.5	9.8	8.5	6.8	5.0	4.1	3.3						
	17,000	10.2	9.3	8.6	7.4	5.8	4.1	3.3	2.5						
	18,000	9.0	8.2	7.6	6.4	4.8	3.3	2.5	1.8						
	19,000	8.0	7.2	6.6	5.5	4.0	2.6	1.9	1.1						
	20,000	7.1	6.3	5.7	4.7	3.3	1.9	1.2	0.6						
	21,000	6.2	5.5	5.0	4.0	2.6	1.3	0.7	0.0						
	22,000	5.5	4.8	4.3	3.3	2.1	0.8	0.2	-0.4						
	22,750	5.0	4.3	3.8	2.9	1.6	0.5	-0.1							
	23,000	4.8	4.1	3.7	2.7	1.5	0.3	-0.2							
	23,100	4.8	4.1	3.6	2.7	1.5	0.3	-0.3							

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... UP
- Flaps ..... 8°
- Speed V2

SECOND SEGMENT CLIMB GRADIENT
FLAPS — 8°

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

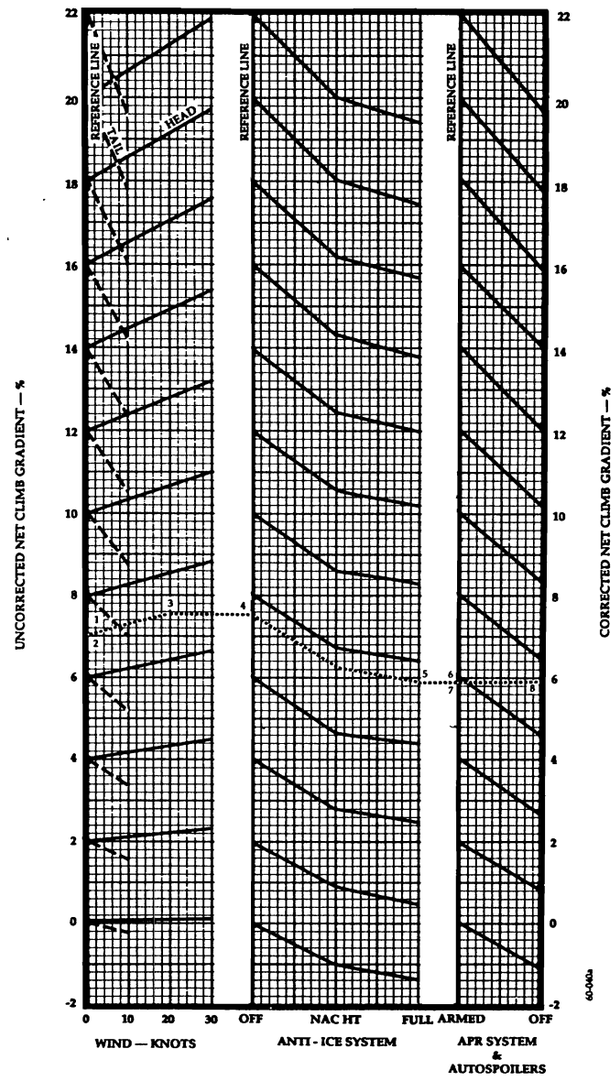


Figure 5-47.1

TAKEOFF WEIGHT LIMIT
FLAPS — 20°, ANTI-ICE — OFF
APR & AUTOSPOILERS — ARMED

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

EXAMPLE:

1. Temperature ..... 60°F (15.6°C)
2. Altitude ..... 12,000 Ft
3. Climb Weight Limit ..... 20,650 Lb (9,367 Kg)
4. Wind Reference Line
5. Headwind ..... 6 Kt
6. Brake Energy Weight Limit ..... 20,200 Lb (9,163 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 20,200 Lb (9,163 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

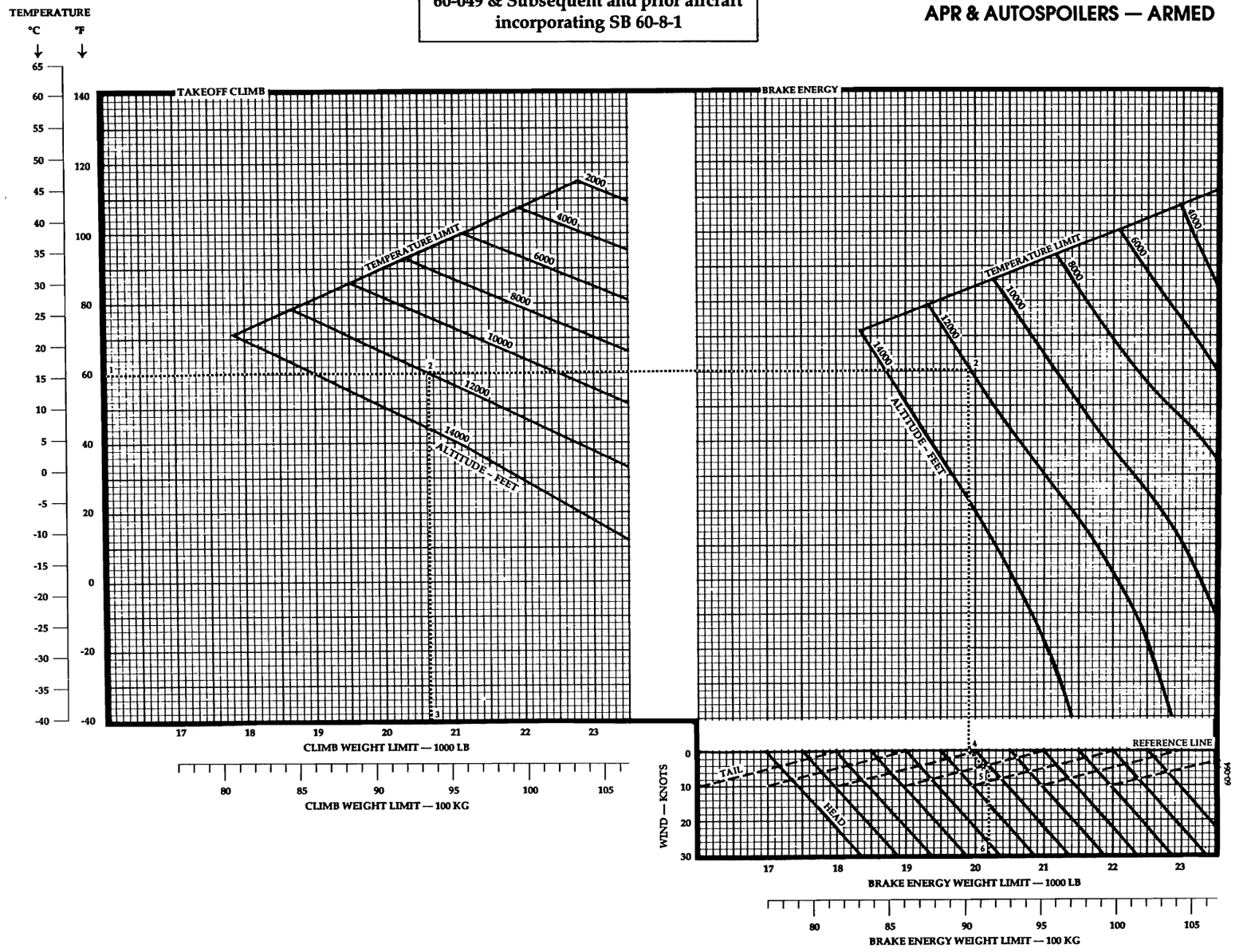


Figure 5-48

TAKEOFF WEIGHT LIMIT
FLAPS — 20°, ANTI-ICE — OFF
APR & AUTOSPOILERS — ARMED

EFFECTIVITY
60-001 thru 60-048 not incorporating SB 60-8-1

EXAMPLE:

1. Temperature ..... 60°F (15.6°C)
2. Altitude ..... 12,000 Ft
3. Climb Weight Limit ..... 20,500 Lb (9,299 Kg)
4. Wind Reference Line
5. Headwind ..... 6 Kt
6. Brake Energy Weight Limit ..... 20,200 Lb (9,163 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 20,200 Lb (9,163 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

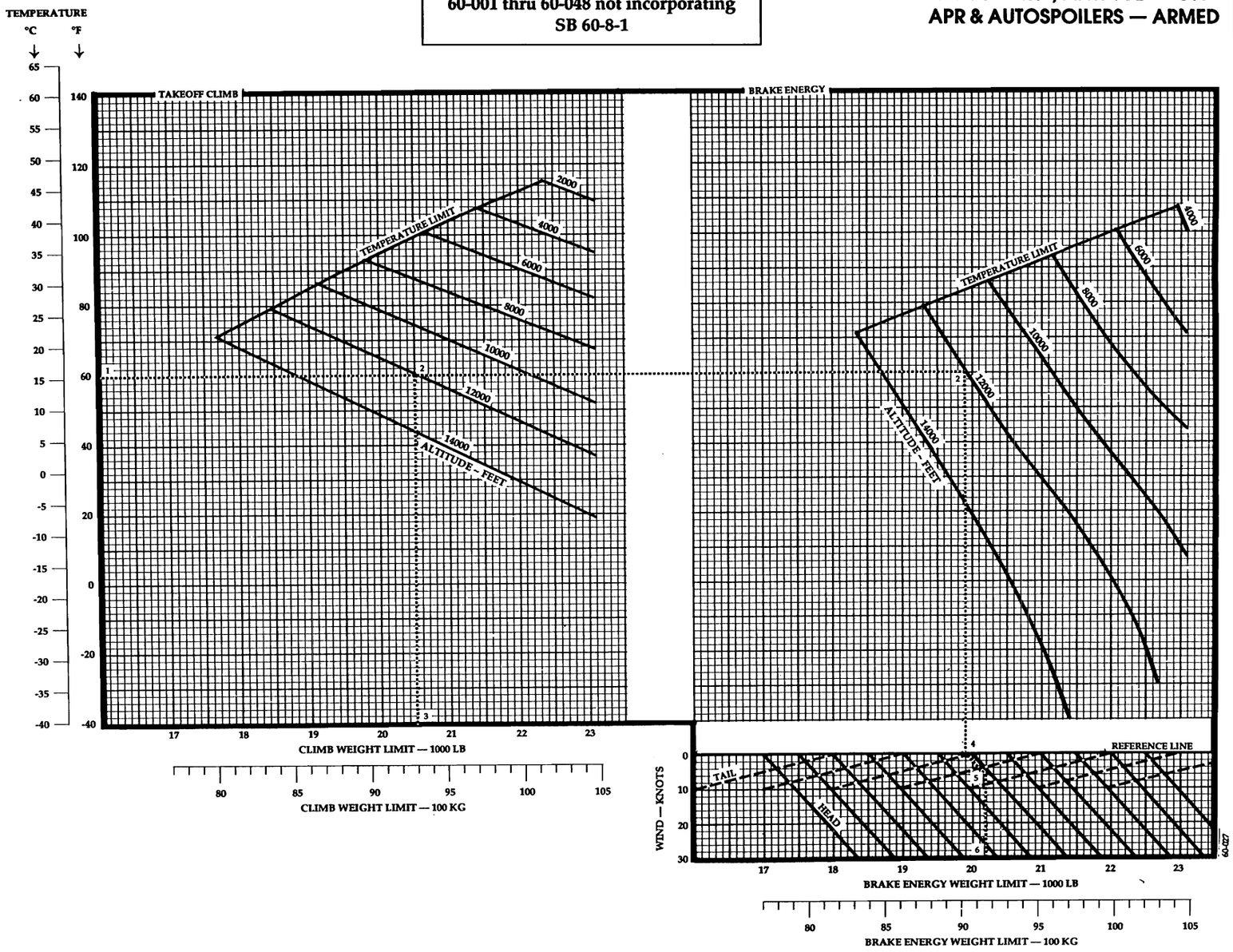


Figure 5-48.1

TAKEOFF WEIGHT LIMIT
FLAPS — 20°, ANTI-ICE — OFF
APR & AUTOSPOILERS — OFF

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

EXAMPLE:

1. Temperature ..... 60°F (15.6°C)
2. Altitude ..... 10,000 Ft
3. Climb Weight Limit ..... 21,000 Lb (9,525 Kg)
4. Wind Reference Line
5. Headwind ..... 20 Kt
6. Brake Energy Weight Limit ..... 21,800 Lb (9,889 Kg)

The most limiting condition is Takeoff Climb

- Takeoff Weight Limit ..... 21,000 Lb (9,525 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

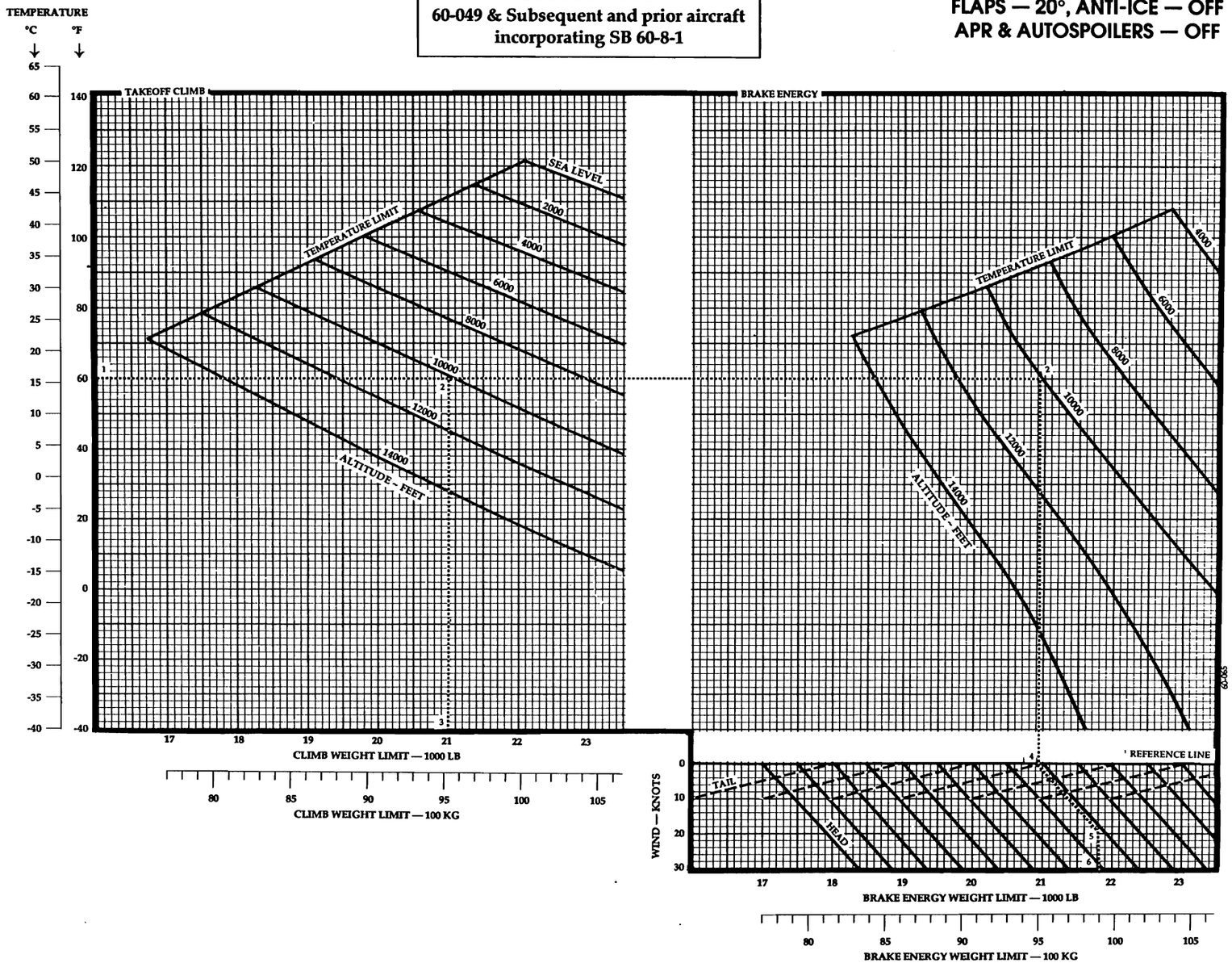


Figure 5-49

TAKEOFF WEIGHT LIMIT
FLAPS — 20°, ANTI-ICE — OFF
APR & AUTOSPOILERS — OFF

EFFECTIVITY
60-001 thru 60-048 not incorporating SB 60-8-1

EXAMPLE:

1. Temperature ..... 60°F (15.6°C)
2. Altitude ..... 10,000 Ft
3. Climb Weight Limit ..... 20,800 Lb (9,435 Kg)
4. Wind Reference Line
5. Headwind ..... 20 Kt
6. Brake Energy Weight Limit ..... 21,800 Lb (9,889 Kg)

The most limiting condition is Takeoff Climb

- Takeoff Weight Limit ..... 20,800 Lb (9,435 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

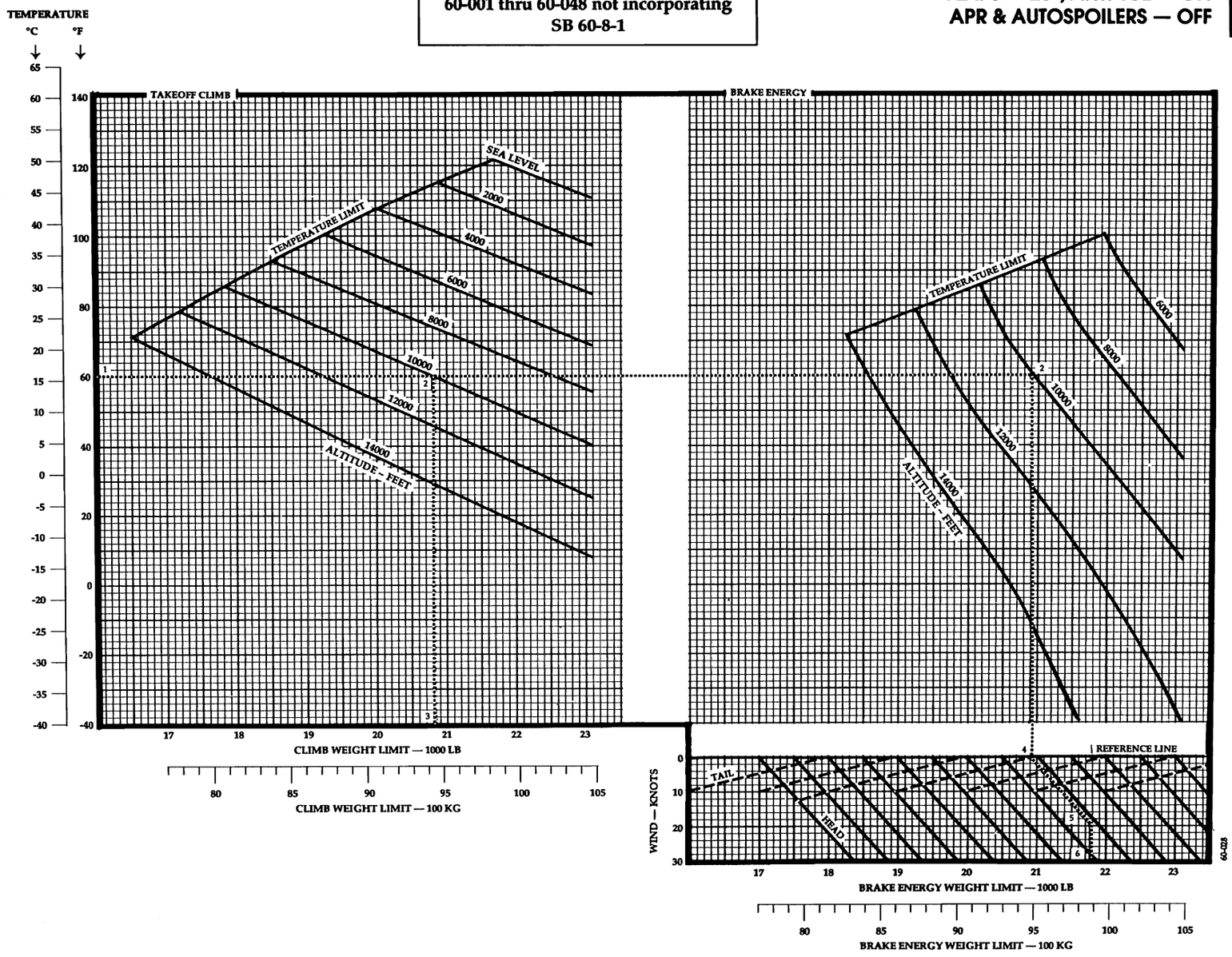


Figure 5-49.1

EFFECTIVITY
All

TAKEOFF WEIGHT LIMIT
FLAPS — 20°, ANTI-ICE — ON
APR & AUTOSPOILERS — ARMED

EXAMPLE:

1. Temperature .....20°F (-6.7°C)
2. Altitude (NAC HT ONLY) ..... 14,000 Ft
3. Climb Weight Limit ..... 22,000 Lb (9,979 Kg)
4. Wind Reference Line
5. Headwind ..... 10 Kt
6. Brake Energy Weight Limit ..... 20,200 Lb (9,163 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 20,200 Lb (9,163 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

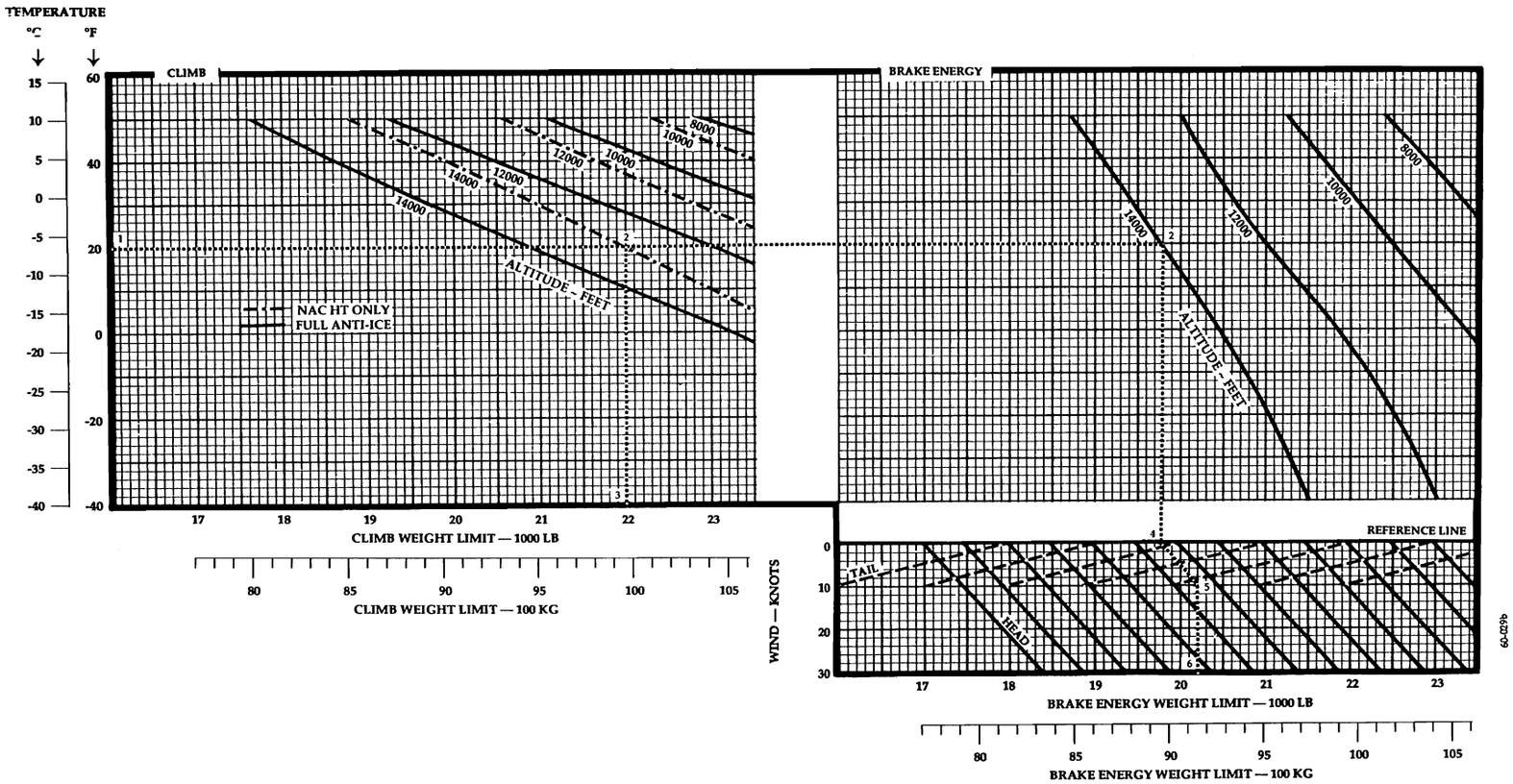


Figure 5-50

EFFECTIVITY
All

TAKEOFF WEIGHT LIMIT
FLAPS — 20°, ANTI-ICE — ON
APR & AUTOSPOILERS — OFF

EXAMPLE:

1. Temperature .....30°F (-1.1°C)
2. Altitude (NAC HT ONLY) ..... 12,000 Ft
3. Climb Weight Limit ..... 21,550 Lb (9,775 Kg)
4. Wind Reference Line
5. Headwind ..... 10 Kt
6. Brake Energy Weight Limit ..... 21,050 Lb (9,548 Kg)

The most limiting condition is Brake Energy

- Takeoff Weight Limit ..... 21,050 Lb (9,548 Kg)

NOTE: The value obtained from this chart may not be the limiting weight. Takeoff Weight is also limited by the maximum certified takeoff weight, and the takeoff weight for the runway length available.

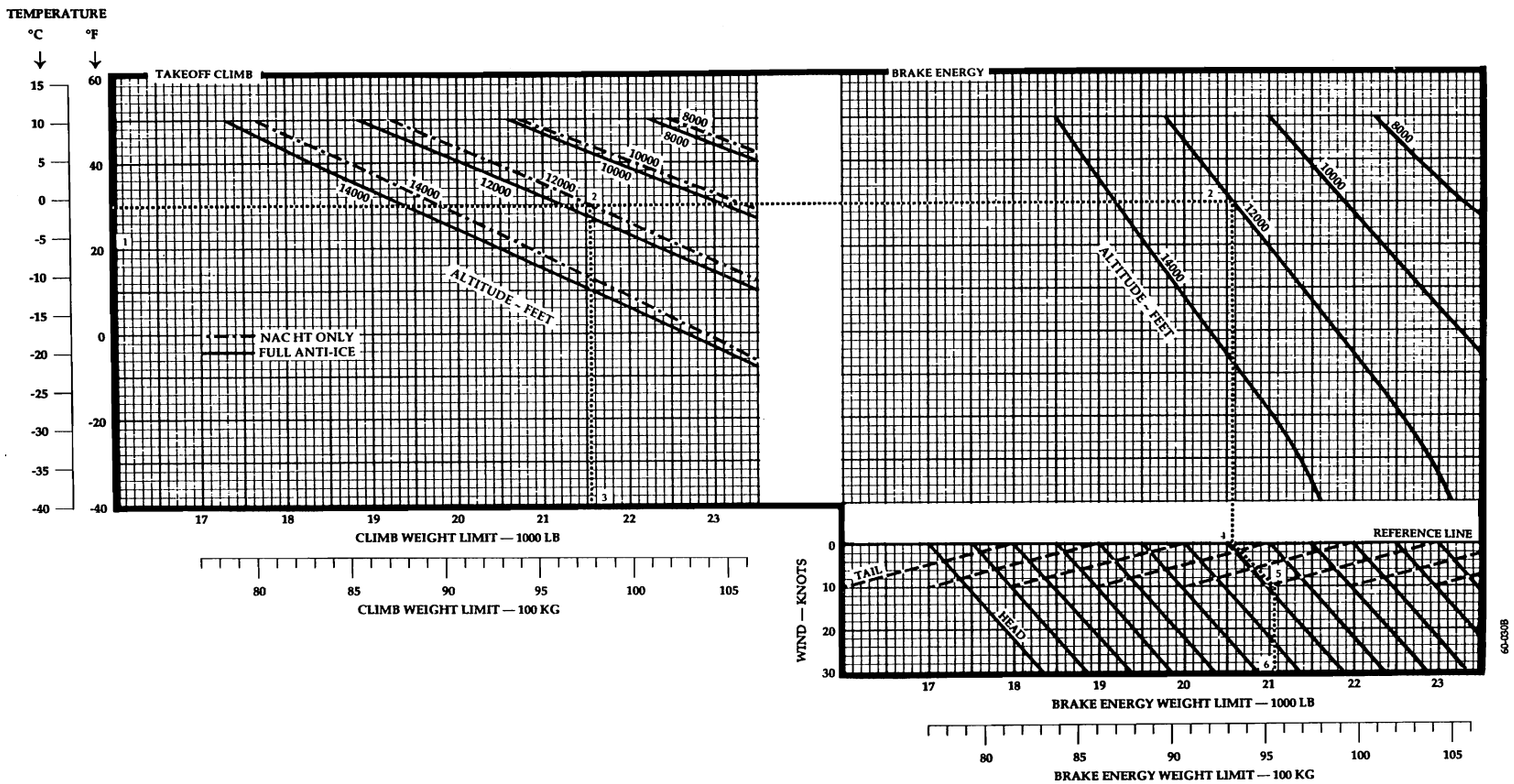


Figure 5-51

TAKEOFF FIELD LENGTH
FLAPS — 20°
Rudder Boost — ON

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		2320	2400	2490	2580	2670	2770	2820	2920	3080	3310	3570	3880		
	16,000		2450	2550	2640	2730	2830	2940	2990	3090	3270	3510	3820	4180		
	17,000		2590	2680	2780	2880	2990	3090	3150	3260	3450	3710	4030	4390		
	18,000		2790	2900	2990	3090	3210	3320	3390	3490	3690	3940	4220	4600		
	19,000		3020	3140	3250	3380	3500	3630	3700	3830	4050	4340	4690	5130		
	20,000		3290	3420	3550	3690	3830	3980	4050	4200	4450	4790	5210	5720		
	21,000		3580	3730	3870	4020	4180	4340	4430	4590	4880	5300	5790	6380		
	22,000		3890	4050	4220	4390	4570	4770	4860	5040	5380	5840	6420	7230		
	22,750		4160	4330	4510	4690	4890	5100	5210	5400	5780	6310	6980	7740		
	23,000		4250	4430	4620	4800	5010	5220	5330	5540	5920	6470	7210	7930		
	23,500		4450	4630	4830	5030	5240	5460	5590	5800	6210	6780	7650	8300		
1000	15,000		2400	2490	2580	2670	2770	2880	2960	3090	3290	3550	3840	4220		
	16,000		2540	2630	2730	2830	2940	3040	3140	3280	3500	3800	4100	4540		
	17,000		2670	2770	2880	2980	3090	3210	3310	3470	3700	4000	4340	4740		
	18,000		2880	2990	3090	3200	3320	3440	3550	3700	3930	4210	4550	4980		
	19,000		3130	3250	3370	3500	3630	3770	3890	4070	4330	4660	5060	5560		
	20,000		3400	3540	3680	3820	3970	4120	4260	4470	4770	5170	5640	6250		
	21,000		3710	3860	4010	4170	4340	4510	4660	4910	5270	5730	6300	7040		
	22,000		4040	4210	4390	4560	4760	4950	5120	5400	5820	6370	7060	7830		
	22,750		4310	4500	4690	4880	5090	5300	5480	5800	6250	6830	7700	8360		
	23,000		4410	4610	4800	5000	5210	5430	5620	5940	6430	7040	7890	8580		
	23,500		4610	4820	5020	5230	5450	5690	5890	6250	6760	7460	8210	9160		
2000	15,000		2480	2580	2670	2770	2870	2970	3100	3290	3540	3810	4160	4570		
	16,000		2620	2720	2820	2930	3040	3150	3280	3490	3770	4110	4460	4890		
	17,000		2760	2870	2980	3090	3200	3330	3470	3700	3980	4320	4690	5190		
	18,000		2980	3080	3200	3310	3440	3560	3720	3940	4200	4520	4920	5400		
	19,000		3230	3360	3490	3620	3760	3910	4080	4340	4640	5030	5490	6050		
	20,000		3530	3670	3820	3960	4120	4280	4480	4760	5150	5600	6150	6840		
	21,000		3840	4000	4160	4330	4500	4680	4910	5260	5710	6210	6910	7690		
	22,000		4190	4370	4560	4740	4940	5150	5400	5810	6310	6920	7800	8450		
	22,750		4480	4680	4870	5070	5290	5520	5790	6250	6810	7590	8280	9350		
	23,000		4590	4790	4990	5200	5420	5650	5930	6400	7020	7760	8480	9750		
	23,500		4800	5010	5220	5430	5680	5920	6220	6720	7360	8180	8890	10630		
3000	15,000		2560	2660	2760	2860	2970	3130	3300	3550	3830	4160	4540	5050		
	16,000		2710	2810	2930	3030	3150	3310	3510	3770	4070	4450	4820	5340		
	17,000		2850	2970	3080	3190	3320	3500	3710	3980	4300	4690	5130	5630		
	18,000		3070	3180	3300	3420	3550	3750	3960	4220	4520	4910	5360	5920		
	19,000		3340	3480	3610	3750	3890	4120	4360	4650	5020	5470	5980	6670		
	20,000		3650	3800	3950	4100	4260	4520	4780	5150	5590	6100	6790	7560		
	21,000		3980	4140	4310	4480	4660	4950	5280	5700	6210	6820	7720	8370		
	22,000		4340	4530	4720	4920	5120	5450	5810	6310	6930	7650	8390	9740		
	22,750		4640	4850	5050	5260	5480	5850	6240	6800	7520	8260	9080	11230		
	23,000		4750	4960	5170	5390	5620	5980	6410	7010	7770	8460	9390			
	23,500		4960	5190	5410	5630	5890	6280	6730	7390	8250	8840	10100			
4000	15,000		2640	2750	2850	2950	3070	3300	3540	3820	4140	4490	4980			
	16,000		2800	2920	3020	3120	3250	3490	3780	4080	4450	4840	5420			
	17,000		2950	3060	3180	3300	3430	3700	3980	4300	4660	5110	5660			
	18,000		3160	3290	3410	3540	3670	3960	4230	4520	4900	5340	5890			
	19,000		3450	3590	3730	3880	4030	4350	4650	5020	5460	5970	6640			
	20,000		3770	3930	4090	4240	4410	4780	5140	5590	6090	6710	7570			
	21,000		4110	4290	4460	4640	4830	5250	5690	6210	6820	7610	8290			
	22,000		4500	4690	4900	5090	5310	5790	6290	6900	7670	8400	9320			
	22,750		4810	5020	5240	5450	5700	6210	6780	7490	8290	9010	10560			
	23,000		4930	5140	5370	5590	5830	6380	6960	7720	8450	9250	11080			
	23,500		5150	5380	5610	5840	6110	6670	7300	8180	8830	9800	12560			
5,000	15,000		2750	2860	2970	3080	3210	3550	3830	4150	4490	4900	5810			
	16,000		2910	3020	3150	3250	3400	3780	4090	4430	4830	5350	6110			
	17,000		3060	3180	3310	3440	3590	3980	4290	4670	5060	5620	6270			
	18,000		3290	3420	3550	3680	3840	4240	4540	4890	5320	5830	6480			
	19,000		3600	3740	3890	4040	4220	4680	5030	5460	5970	6560	7430			
	20,000		3930	4100	4260	4430	4630	5170	5590	6080	6700	7450	8190			
	21,000		4290	4470	4660	4850	5080	5720	6200	6800	7490	8320	9280			
	22,000		4700	4910	5120	5330	5600	6310	6890	7620	8410	9200	11100			
	22,750		5030	5260	5490	5720	6000	6770	7460	8360	8980	10100				
	23,000		5150	5390	5610	5850	6150	6980	7660	8510	9240	10570				
	23,500		5390	5640	5890	6130	6430	7340	8030	8860	9720	11590				
6,000	15,000		2860	2970	3090	3200	3350	3840	4160	4520	4880	5500				
	16,000		3020	3150	3260	3380	3560	4090	4440	4820	5300	5900				
	17,000		3180	3320	3440	3580	3760	4310	4670	5060	5550	6120				
	18,000		3410	3560	3690	3830	4020	4560	4890	5310	5800	6420				
	19,000		3740	3890	4050	4210	4420	5050	5460	5950	6550	7320				
	20,000		4090	4260	4440	4610	4860	5610	6090	6670	7340	8210				
	21,000		4470	4660	4860	5060	5340	6210	6790	7490	8320	9110				
	22,000		4910	5120	5340	5570	5880	6910	7580	8470	9150	10520				
	22,750		5260	5490	5730	5960	6290	7450	8270	8990	9900	12240				
	23,000		5380	5620	5870	6120	6470	7600	8550	9210	10200					
	23,500		5630	5890	6140	6390	6750	8120	8900	9680	10990					

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		2960	3080	3190	3310	3590	4160	4470	4860	5390	6090			
	16,000		3130	3250	3390	3510	3810	4410	4800	5250	5790	6650			
	17,000		3300	3430	3570	3720	4030	4660	5030	5520	6090	6950			
	18,000		3540	3690	3840	3990	4310	4930	5340	5800	6360	7040			
	19,000		3890	4050	4220	4390	4750	5500	5970	6520	7240	8050			
	20,000		4260	4440	4620	4820	5240	6140	6680	7370	8200	9140			
	21,000		4660	4870	5070	5300	5790	6830	7520	8300	9030	10330			
	22,000		5120	5350	5580	5830	6400	7640	8490	9150	10120				
	22,750		5480	5740	5980	6250	6850	8320	9030	9870	11370				
	23,000		5620	5870	6120	6420	7060	8520	9250	10170	12000				
	23,500		5890	6160	6420	6710	7410	9010	9700	10760	13620				
8000	15,000		3060	3180	3300	3440	3850	4500	4860	5300	5910	6840			
	16,000		3240	3370	3500	3650	4090	4810	5250	5700	6550	7570			
	17,000		3410	3560	3700	3860	4330	5080	5530	6050	6650	7650			
	18,000		3670	3820	3970	4140	4620	5350	5800	6340	7010	7890			
	19,000		4030	4200	4370	4560	5100	5980	6530	7130	8060	9730			
	20,000		4410	4600	4790	5010	5660	6700	7300	8210	8850	10030			
	21,000		4840	5050	5270	5510	6280	7460	8350	9000	9940				
	22,000		5320	5560	5800	6070	6930	8420	9120	10030	11740				
	22,750		5700	5960	6210	6500	7440	9070	9860	10960					
	23,000		5840	6100	6380	6680	7680	9300	10130	11380					
	23,500		6120	6400	6680	7000	8130	9710	10690	12560					
9000	15,000		3160	3280	3410	3670	4200	4940	5310	5820	6680				
	16,000		3340	3480	3620	3910	4450	5250	5740	6300	7380				
	17,000		3530	3680	3830	4120	4700	5510	6020	6630	7440				
	18,000		3830	3980	4150	4460	5030	5900	6400	7070	7910				
	19,000		4200	4380	4570	4920	5610	6610	7230	8090	8780				
	20,000		4610	4810	5010	5430	6240	7420	8240	8940	9900				
	21,000		5060	5290	5530	6000	6940	8450	9110	10020	11690				
	22,000		5570	5830	6090	6630	7740	9300	10160	11370					
	22,750		5970	6240	6530	7130	8410	10010	11050						
	23,000		6130	6410	6700	7310	8670	10260	11400						
	23,500		6410	6700	7010	7700	9180	10840	12170						
10000	15,000		3260	3390	3550	3950	4580	5340	5880	6510	7840				
	16,000		3460	3600	3770	4200	4880	5760	6350	7170	7990				
	17,000		3650	3800	3970	4420	5130	6030	6630	7340	7940				
	18,000		3960	4120	4300	4770	5490	6450	7090	7830	8590				
	19,000		4350	4540	4740	5270	6140	7300	8020	8800	9730				
	20,000		4770	4980	5210	5850	6860	8280	9020	9860	11540				
	21,000		5250	5490	5750	6470	7680	9220	10040	11220					
	22,000		5780	6040	6330	7170	8630	10210	11290						
	22,750		6200	6470	6790	7700	9400	11080	12620						
	23,000		6360	6650	6970	7930	9620	11410							
	23,500		6650	6960	7300	8310	9970	12110							
12,000	15,000		3580	3850	4160	4670	5460	6430	7400	8540					
	16,000		3780	4070	4420	4950	5750	7000	8000	8400					
	17,000		4020	4300	4670	5210	6070	7290	8110	8690					
	18,000		4390	4700	5090	5690	6650	8030	8770	9610					
	19,000		4840	5200	5670	6350	7540	9030	9860	11010					
	20,000		5330	5760	6300	7120	8510	10100	11170						
	21,000		5900	6380	7010	7960	9530	11400							
	22,000		6490	7050	7800	8950	10520	13180							
	22,750		6980	7580	8470	9620	11410								
	23,000		7140	7820	8740	9960	11780								
	23,500		7550	8270	9240	10380	12490								
14,000	15,000		4180	4490	4900	5570	6620	8330	8880	9690					
	16,000		4430	4780	5210	5930	6940	8640	8940	10090					
	17,000		4710	5070	5500	6250	7290	8970	9580	10540					
	18,000		5250	5670	6190	7040	8350	9980	10960						
	19,000		5850	6340	6930	8000	9490	11350	13010						
	20,000		6510	7060	7780	8990	10610	13110							
	21,000		7220	7900	8740	10050	11950								
	22,000		8050	8830	9930	11170									
	22,750		8670	9670	10470	12150									
	23,000		8970	9800	10720	12520									
	23,500		9550	10250	11300	13250									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-53.

Figure 5-52

TAKEOFF FIELD LENGTH
FLAPS — 20°
Rudder Boost — ON

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		2360	2450	2540	2630	2730	2830	2880	2980	3130	3360	3650	4000		
	16,000		2500	2590	2690	2780	2890	3000	3060	3150	3320	3590	3890	4230		
	17,000		2620	2720	2830	2930	3040	3160	3220	3330	3510	3780	4100	4490		
	18,000		2820	2920	3020	3130	3240	3360	3430	3540	3730	3990	4310	4710		
	19,000		3060	3180	3290	3420	3550	3680	3750	3880	4090	4380	4760	5220		
	20,000		3330	3460	3600	3730	3880	4030	4110	4260	4500	4850	5300	5830		
	21,000		3630	3770	3930	4070	4240	4410	4490	4670	4950	5380	5890	6510		
	22,000		3950	4120	4290	4460	4650	4850	4940	5140	5460	5950	6570	7400		
	22,750		4220	4400	4590	4770	4980	5190	5300	5510	5860	6430	7100	7860		
	23,000		4320	4510	4700	4890	5100	5310	5420	5650	6000	6610	7380	8050		
	23,100		4360	4550	4740	4930	5150	5360	5480	5700	6080	6640	7480	8140		
1000	15,000		2440	2530	2630	2720	2820	2930	3010	3150	3350	3620	3950	4310		
	16,000		2590	2680	2780	2880	2990	3100	3190	3350	3560	3870	4220	4620		
	17,000		2710	2820	2930	3030	3150	3260	3370	3540	3770	4080	4450	4850		
	18,000		2910	3010	3120	3240	3360	3480	3590	3760	3990	4280	4650	5090		
	19,000		3160	3290	3410	3540	3670	3810	3930	4130	4380	4720	5150	5670		
	20,000		3450	3590	3730	3870	4020	4180	4310	4530	4840	5250	5720	6370		
	21,000		3760	3910	4070	4220	4400	4570	4730	4990	5350	5820	6400	7210		
	22,000		4100	4280	4450	4630	4830	5030	5210	5500	5910	6490	7220	7920		
	22,750		4380	4570	4760	4960	5170	5390	5580	5910	6350	7020	7800	8580		
	23,000		4490	4680	4880	5080	5300	5520	5710	6050	6510	7200	7990	8940		
	23,100		4530	4730	4930	5130	5350	5580	5780	6100	6620	7310	8040	9070		
2000	15,000		2530	2620	2720	2820	2920	3040	3150	3350	3620	3900	4270	4680		
	16,000		2670	2780	2880	2990	3100	3210	3340	3570	3860	4160	4590	5060		
	17,000		2810	2920	3030	3140	3260	3390	3540	3770	4070	4410	4830	5290		
	18,000		3000	3120	3230	3350	3480	3610	3770	4000	4270	4620	5030	5540		
	19,000		3270	3400	3530	3660	3810	3950	4130	4390	4710	5110	5590	6160		
	20,000		3570	3720	3860	4010	4170	4330	4530	4840	5230	5700	6270	7030		
	21,000		3890	4060	4220	4380	4560	4750	4960	5350	5800	6330	7070	7790		
	22,000		4250	4440	4620	4820	5010	5230	5490	5910	6430	7070	7870	8760		
	22,750		4550	4750	4950	5150	5370	5600	5880	6350	6910	7790	8430	9800		
	23,000		4660	4870	5070	5280	5500	5730	6040	6520	7170	7980	8650	10300		
	23,100		4700	4910	5120	5330	5560	5800	6090	6580	7260	8040	8750	10450		
3000	15,000		2610	2710	2810	2910	3020	3190	3370	3610	3930	4260	4670	5190		
	16,000		2760	2860	2970	3080	3200	3390	3580	3840	4200	4560	5000	5750		
	17,000		2900	3020	3130	3250	3380	3580	3790	4080	4420	4790	5250	6020		
	18,000		3100	3220	3340	3460	3590	3810	4020	4290	4630	5040	5520	6120		
	19,000		3380	3510	3650	3790	3930	4170	4410	4720	5120	5590	6140	6940		
	20,000		3690	3840	3990	4150	4310	4580	4850	5240	5700	6240	6990	7740		
	21,000		4030	4190	4370	4530	4730	5040	5370	5810	6350	7000	7820	8810		
	22,000		4400	4600	4790	4990	5200	5550	5920	6440	7100	7920	8640	10440		
	22,750		4710	4920	5130	5330	5570	5940	6370	6920	7720	8440	9570	12920		
	23,000		4820	5040	5260	5470	5700	6100	6540	7120	8000	8640	9970			
	23,100		4870	5080	5310	5520	5750	6160	6600	7240	8110	8740	10090			
4000	15,000		2690	2790	2900	3010	3120	3370	3620	3900	4260	4670	5210			
	16,000		2850	2950	3070	3190	3300	3570	3840	4160	4560	4960	5810			
	17,000		3000	3120	3240	3360	3490	3780	4070	4420	4800	5290	5910			
	18,000		3200	3320	3450	3580	3720	4020	4290	4630	5040	5530	6140			
	19,000		3490	3630	3770	3920	4070	4410	4720	5120	5580	6140	6990			
	20,000		3820	3970	4130	4300	4460	4850	5230	5690	6250	6920	7750			
	21,000		4160	4340	4520	4700	4900	5340	5800	6340	6970	7870	8800			
	22,000		4560	4760	4970	5160	5390	5900	6400	7040	7930	8590	10060			
	22,750		4880	5090	5320	5540	5770	6330	6940	7620	8440	9300	11760			
	23,000		5000	5220	5450	5670	5910	6490	7100	7920	8640	9670	12730			
	23,100		5040	5270	5500	5730	5960	6550	7170	8030	8700	9820	13220			
5,000	15,000		2800	2910	3010	3130	3260	3620	3890	4240	4590	5100	5780			
	16,000		2960	3070	3190	3310	3450	3850	4170	4550	4950	5540	6280			
	17,000		3120	3240	3370	3490	3650	4070	4400	4760	5240	5710	6620			
	18,000		3320	3460	3590	3720	3890	4300	4610	5010	5460	6020	6730			
	19,000		3630	3780	3930	4080	4270	4740	5120	5570	6100	6720	7590			
	20,000		3980	4140	4310	4470	4680	5240	5690	6230	6860	7670	8400			
	21,000		4340	4530	4720	4910	5150	5800	6310	6930	7780	8460	9830			
	22,000		4760	4980	5190	5410	5670	6410	7040	7760	8540	9540	12270			
	22,750		5100	5330	5560	5790	6070	6880	7640	8470	9200	10750				
	23,000		5220	5460	5700	5940	6230	7110	7870	8640	9470	11280				
	23,100		5280	5520	5760	6000	6290	7180	7880	8730	9560	11540				
6,000	15,000		2900	3020	3140	3250	3400	3900	4230	4630	5000	5580				
	16,000		3070	3200	3310	3440	3630	4160	4520	4940	5450	6190				
	17,000		3230	3370	3500	3630	3820	4390	4780	5170	5710	6390				
	18,000		3450	3590	3730	3870	4070	4610	5000	5450	5950	6570				
	19,000		3780	3930	4090	4250	4470	5110	5550	6070	6660	7480				
	20,000		4130	4310	4480	4660	4910	5680	6190	6810	7600	8310				
	21,000		4520	4720	4920	5120	5400	6310	6920	7700	8430	9340				
	22,000		4970	5190	5410	5630	5940	6960	7760	8580	9330	11050				
	22,750		5320	5560	5800	6040	6400	7560	8470	9160	10220	13550				
	23,000		5450	5700	5950	6200	6550	7810	8670	9420	10630					
	23,100		5510	5760	6010	6250	6610	7910	8740	9530	10810					

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		3000	3130	3240	3370	3640	4240	4620	4990	5650	6380			
	16,000		3180	3300	3440	3570	3880	4520	4920	5420	6070	7160			
	17,000		3350	3490	3630	3770	4100	4760	5170	5680	6260	7140			
	18,000		3580	3730	3870	4020	4350	4990	5420	5940	6560	7400			
	19,000		3930	4090	4250	4430	4800	5570	6080	6700	7500	8230			
	20,000		4300	4480	4670	4860	5310	6220	6820	7620	8390	9330			
	21,000		4710	4930	5130	5360	5870	6930	7690	8510	9330	11220			
	22,000		5180	5420	5650	5900	6490	7730	8650	9350	10680				
	22,750		5550	5800	6060	6320	6940	8450	9170	10140	12480				
	23,000		5680	5940	6200	6490	7170	8740	9390	10470	13500				
	23,100		5740	5990	6270	6560	7230	8780	9480	10600	13990				
8000	15,000		3100	3230	3350	3500	3930	4570	4980	5550	6150	7380			
	16,000		3290	3420	3550	3700	4170	4900	5390	5990	6970	7810			
	17,000		3460	3610	3750	3910	4400	5150	5660	6190	7150	7830			
	18,000		3710	3860	4010	4180	4670	5420	5910	6520	7310	8090			
	19,000		4070	4240	4410	4600	5160	6070	6670	7340	8260	9270			
	20,000		4450	4650	4840	5050	5730	6770	7520	8390	9220	11280			
	21,000		4890	5110	5330	5570	6360	7610	8560	9270	10690				
	22,000		5370	5620	5870	6140	7030	8620	9320	10390	13610				
	22,750		5760	6030	6280	6570	7570	9190	10360	11640					
	23,000		5890	6160	6450	6760	7810	9420	10360	12300					
	23,100		5950	6210	6520	6830	7850	9470	10480	12580					
9000	15,000		3210	3320	3460	3730	4250	5020	5450	6100	6990				
	16,000		3390	3540	3670	3950	4550	5360	5940	6740	7900				
	17,000		3580	3730	3890	4180	4780	5640	6180	6780	7510				
	18,000		3860	4020	4190	4500	5080	5970	6520	7270	8100				
	19,000		4240	4420	4610	4960	5670	6700	7360	8320	9060				
	20,000		4650	4850	5060	5480	6320	7570	8490	9170	10480				
	21,000		5110	5340	5580	6070	7020	8570	9300	10350	13200				
	22,000		5630	5890	6150	6690	7790	9420	10360	12210					
	22,750		6030	6300	6590	7170	8480	10150	11340						
	23,000		6170	6470	6770	7390	8780	10420	11710						
	23,100		6250	6540	6840	7470	8890	10530	11880						
10000	15,000		3300	3440	3600	4010	4660	5440	5990	6880	9070				
	16,000		3510	3640	3820	4240	4980	5910	6600	7650	8380				
	17,000		3700	3850	4030	4480	5210	6140	6840	7740	8300				
	18,000		3990	4150	4340	4810	5530	6540	7210	8110	8800				
	19,000		4380	4570	4780	5310	6190	7410	8280	8960	10170				
	20,000		4810	5020	5250	5900	6930	8140	9140	10150	12590				
	21,000		5300	5530	5790	6530	7760	9310	10240	11950					
	22,000		5830	6100	6380	7240	8730	10330	11590						
	22,750		6250	6530	6840	7790	9470	11250	13580						
	23,000		6390	6710	7040	8000	9660	11610							
	23,100		6480	6770	7100	8080	9730	11740							
12,000	15,000		3610	3860	4210	4730	5540	6610	7540	8270					
	16,000		3830	4110	4460	5040	5850	7110	8270	8680					
	17,000		4050	4340	4700	5290	6190	7460	8070	8870					
	18,000		4420	4720	5100	5740	6710	8010	8840	9760					
	19,000		4870	5200	5660	6410	7570	9100	9960	11470					
	20,000		5380	5770	6290	7160	8610	10200	11350						
	21,000		5940	6370	6990	8000	9580	11510							
	22,000		6540	7040	7740	9000	10600	13490							
	22,750		7030	7570	8390	9880	11480								
	23,000		7210	7790	8630	10040	11830								
	23,100		7280	7870	8730	10100	11970								
14,000	15,000		4250	4590	4950	5630	6730	8430	8870	10090					
	16,000		4470	4820	5260	6000	7110	8920	9250	10630					
	17,000		4740	5100	5530	6280	7370	8890	9710	10920					
	18,000		5280	5710	6210	7100	8490	10020	11140						
	19,000		5890	6360	6980	8010	9510	11450	13870						
	20,000		6530	7100	7780	9030	10660	13560							
	21,000		7270	7910	8800	10100	12010								
	22,000		8110	8910	9920	11230									
	22,750		8780	9600	10470	12200									
	23,000		9060	9870	10770	12570									
	23,100		9160	9930	10870	12700									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-53.

Figure 5-52.1

EFFECTIVITY
All

TAKEOFF FIELD LENGTH CORRECTION CHART
FLAPS — 20°
Rudder Boost — ON

EXAMPLE:

1. Uncorrected Takeoff Field Length (from table) . . . . . .7,500 Ft (2,286 M)
2. Headwind . . . . . 20 Kt
3. Runway Gradient Reference Line
4. Runway Gradient. . . . . -1.4% DN
5. Anti-Skid System Reference Line
6. Anti-Skid System . . . . . .ON
7. Anti-Ice System Reference Line
8. Anti-Ice System . . . . . OFF
9. APR and Autospoilers Reference Line
10. APR and Autospoilers System. . . . . OFF
11. Altitude Reference Line
12. Altitude . . . . . 8,000 Ft
13. Corrected Takeoff Field Length . . . .7,550 Ft (2,301 M)

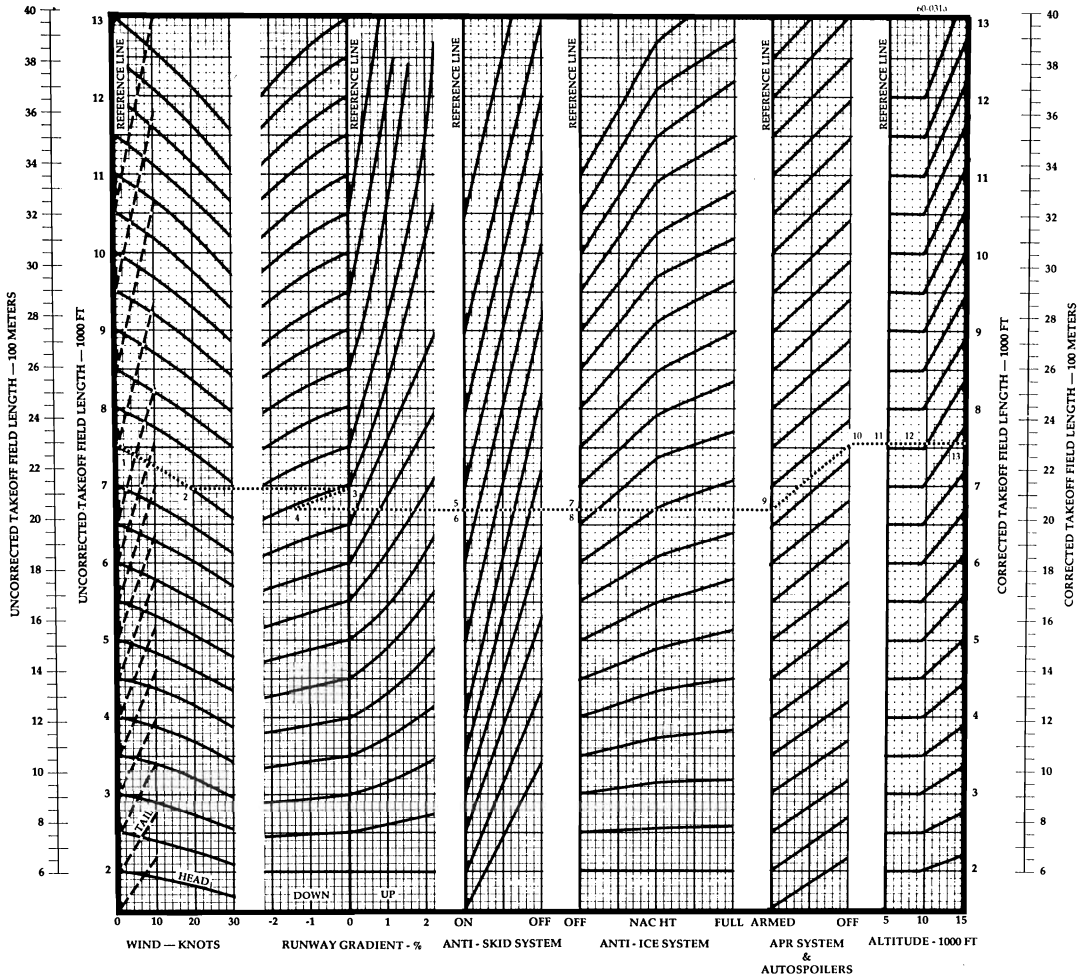


Figure 5-53

TAKEOFF FIELD LENGTH
FLAPS — 20°
Rudder Boost — OFF

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		3120	3210	3300	3400	3510	3620	3680	3770	3910	4050	4210	4390		
	16,000		3170	3260	3360	3470	3590	3700	3770	3870	4020	4170	4340	4530		
	17,000		3210	3320	3440	3550	3670	3800	3860	3970	4130	4290	4470	4680		
	18,000		3280	3390	3510	3640	3760	3890	3960	4070	4240	4420	4610	4830		
	19,000		3340	3470	3590	3720	3850	3990	4060	4180	4360	4540	4750	5130		
	20,000		3410	3540	3680	3810	3950	4090	4160	4290	4480	4790	5210	5710		
	21,000		3580	3720	3870	4020	4180	4340	4430	4590	4890	5300	5790	6380		
	22,000		3890	4050	4220	4390	4570	4760	4860	5040	5380	5840	6430	7230		
	22,750		4160	4330	4510	4690	4890	5100	5200	5390	5770	6310	6980	7740		
	23,000		4250	4430	4620	4800	5010	5220	5330	5530	5910	6470	7210	7930		
	23,500		4440	4630	4830	5030	5240	5460	5590	5800	6210	6780	7650	8310		
1000	15,000		3210	3310	3400	3510	3630	3740	3830	3950	4090	4250	4420	4610		
	16,000		3260	3360	3480	3590	3710	3830	3930	4050	4210	4380	4560	4770		
	17,000		3320	3440	3560	3680	3800	3930	4030	4170	4330	4510	4710	4930		
	18,000		3390	3510	3640	3770	3900	4030	4140	4280	4460	4650	4860	5090		
	19,000		3460	3590	3720	3860	3990	4130	4250	4400	4580	4790	5060	5360		
	20,000		3530	3670	3810	3950	4090	4240	4360	4510	4770	5170	5630	6250		
	21,000		3710	3860	4020	4170	4340	4510	4660	4910	5270	5730	6300	7040		
	22,000		4040	4210	4380	4560	4760	4950	5120	5400	5820	6370	7060	7820		
	22,750		4310	4500	4690	4880	5090	5300	5480	5800	6240	6830	7700	8380		
	23,000		4420	4610	4800	4990	5210	5430	5620	5940	6430	7030	7900	8580		
	23,500		4610	4820	5020	5220	5450	5690	5890	6240	6770	7460	8210	9160		
2000	15,000		3310	3410	3520	3630	3750	3870	3990	4140	4290	4460	4640	4860		
	16,000		3360	3480	3600	3720	3840	3970	4100	4260	4420	4600	4800	5030		
	17,000		3430	3550	3680	3810	3940	4070	4210	4380	4550	4750	4960	5200		
	18,000		3500	3630	3770	3900	4040	4180	4330	4500	4690	4900	5130	5400		
	19,000		3580	3720	3860	4000	4140	4290	4440	4630	4830	5050	5490	6060		
	20,000		3660	3800	3950	4090	4240	4400	4560	4760	5150	5590	6150	6840		
	21,000		3840	4000	4160	4330	4500	4680	4910	5260	5700	6210	6910	7690		
	22,000		4190	4370	4550	4740	4940	5150	5400	5810	6310	6930	7800	8460		
	22,750		4480	4670	4870	5070	5290	5510	5790	6240	6810	7590	8280	9350		
	23,000		4590	4790	4990	5200	5420	5650	5920	6400	7030	7770	8480	9750		
	23,500		4800	5010	5220	5430	5680	5920	6220	6720	7360	8190	8890	10830		
3000	15,000		3400	3520	3630	3760	3880	4050	4180	4340	4510	4690	4900	5140		
	16,000		3470	3590	3720	3850	3980	4160	4300	4470	4650	4850	5070	5330		
	17,000		3540	3670	3810	3940	4080	4270	4430	4600	4800	5010	5250	5620		
	18,000		3620	3760	3900	4040	4180	4390	4550	4740	4950	5170	5430	5910		
	19,000		3700	3850	3990	4140	4290	4500	4680	4880	5100	5470	5980	6670		
	20,000		3790	3940	4090	4240	4400	4620	4810	5150	5590	6100	6780	7570		
	21,000		3970	4140	4310	4480	4660	4960	5280	5700	6210	6820	7720	8370		
	22,000		4340	4530	4720	4910	5120	5450	5810	6310	6930	7650	8400	9740		
	22,750		4640	4850	5050	5260	5480	5850	6240	6800	7520	8270	9080	11230		
	23,000		4750	4960	5170	5390	5620	5980	6410	7010	7770	8460	9390			
	23,500		4970	5190	5410	5630	5890	6280	6720	7380	8250	8840	10100			
4000	15,000		3510	3630	3760	3890	4010	4240	4390	4560	4740	4950	5180			
	16,000		3580	3710	3850	3980	4120	4360	4520	4700	4900	5120	5370			
	17,000		3660	3800	3940	4080	4220	4480	4660	4850	5060	5300	5580			
	18,000		3740	3890	4040	4180	4330	4610	4790	5000	5230	5480	5880			
	19,000		3830	3980	4140	4290	4450	4740	4940	5150	5460	5970	6630			
	20,000		3920	4080	4240	4400	4580	4870	5140	5590	6100	6700	7570			
	21,000		4110	4290	4460	4640	4830	5250	5690	6210	6820	7610	8300			
	22,000		4500	4690	4890	5090	5310	5790	6280	6900	7670	8390	9320			
	22,750		4810	5020	5240	5450	5690	6210	6780	7490	8300	9010	10560			
	23,000		4920	5140	5360	5590	5830	6370	6960	7720	8460	9250	11090			
	23,500		5150	5380	5610	5840	6110	6670	7310	8190	8830	9800	12540			
5,000	15,000		3640	3780	3910	4040	4190	4460	4620	4800	5010	5240	8500			
	16,000		3720	3860	4000	4140	4300	4590	4760	4960	5180	5430	5710			
	17,000		3810	3950	4100	4250	4410	4720	4910	5120	5360	5620	6160			
	18,000		3890	4050	4200	4360	4530	4860	5060	5290	5540	5830	6470			
	19,000		3990	4150	4310	4470	4650	5010	5220	5460	5970	6560	7430			
	20,000		4080	4240	4410	4580	4770	5170	5590	6080	6710	7450	8190			
	21,000		4290	4480	4660	4850	5080	5720	6200	6790	7490	8320	9280			
	22,000		4700	4910	5120	5330	5590	6320	6890	7620	8410	9210	11100			
	22,750		5030	5260	5480	5710	5990	6770	7470	8350	8980	10100				
	23,000		5150	5380	5610	5840	6150	6980	7660	8510	9240	10570				
	23,500		5390	5640	5880	6130	6430	7340	8020	8860	9720	11590				
6,000	15,000		3790	3930	4060	4200	4370	4700	4870	5070	5300	5560				
	16,000		3870	4020	4160	4310	4490	4840	5030	5250	5490	5770				
	17,000		3960	4120	4270	4420	4620	4990	5190	5420	5690	6100				
	18,000		4050	4220	4380	4540	4740	5140	5360	5600	5890	6420				
	19,000		4150	4320	4490	4660	4870	5300	5530	5950	6540	7330				
	20,000		4250	4420	4600	4780	5000	5610	6090	6670	7330	8210				
	21,000		4470	4660	4860	5060	5340	6210	6790	7490	8320	9110				
	22,000		4910	5120	5340	5560	5870	6900	7590	8460	9150	10520				
	22,750		5250	5490	5730	5960	6290	7450	8270	8990	9910	12240				
	23,000		5370	5610	5870	6110	6460	7610	8550	9200	10200					
	23,500		5630	5880	6140	6390	6760	8130	8900	9680	10990					

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		3930	4080	4220	4380	4610	4950	5140	5360	5610	5980			
	16,000		4020	4180	4330	4490	4740	5110	5320	5550	5820	6200			
	17,000		4120	4280	4440	4610	4870	5270	5500	5750	6030	6720			
	18,000		4210	4380	4550	4730	5010	5440	5680	5950	6350	7080			
	19,000		4310	4490	4670	4850	5160	5610	5970	6520	7240	8050			
	20,000		4420	4600	4790	4980	5300	6140	6670	7380	8210	9140			
	21,000		4660	4870	5070	5290	5790	6830	7530	8310	9030	10330			
	22,000		5120	5350	5570	5830	6400	7640	8490	9150	10120	12820			
	22,750		5480	5730	5980	6240	6840	8320	9030	9870	11370				
	23,000		5610	5870	6120	6410	7060	8520	9250	10180	12000				
	23,500		5890	6160	6420	6720	7410	9020	9700	10760	13620				
8000	15,000		4090	4240	4390	4560	4870	5230	5440	5680	5950	6360			
	16,000		4180	4340	4500	4680	5010	5400	5630	5890	6180	6670			
	17,000		4280	4450	4620	4810	5160	5580	5830	6100	6830	7660			
	18,000		4380	4560	4740	4930	5310	5760	6030	6340	7000	7980			
	19,000		4490	4670	4860	5060	5470	5980	6530	7130	8060	8720			
	20,000		4590	4790	4990	5200	5660	6700	7300	8210	8860	10030			
	21,000		4840	5050	5270	5510	6270	7460	8350	9000	9940				
	22,000		5320	5550	5800	6070	6930	8420	9130	10030	11730				
	22,750		5690	5950	6210	6510	7440	9070	9850	10970					
	23,000		5830	6090	6380	6690	7680	9300	10130	11380					
	23,500		6120	6400	6680	7000	8130	9710	10690	12560					
9000	15,000		4240	4400	4570	4800	5140	5550	5780	6040	6340				
	16,000		4340	4510	4680	4940	5300	5740	5990	6270	6810				
	17,000		4450	4620	4810	5080	5470	5940	6210	6560	7390				
	18,000		4550	4740	4930	5220	5640	6140	6430	7070	7910				
	19,000		4660	4860	5060	5360	5810	6600	7230	8090	8780				
	20,000		4780	4980	5190	5520	6240	7420	8280	8940	9900				
	21,000		5060	5290	5530	6000	6940	8450	9120	10020	11690				
	22,000		5570	5820	6090	6620	7750	9300	10160	11370					
	22,750		5970	6240	6520	7130	8410	10010	11060						
	23,000		6130	6410	6700	7310	8670	10260	11390						
	23,500		6410	6710	7010	7700	9180	10830	12170						
10000	15,000		4410	4580	4750	5070	5450	5900	6160	6450	6970				
	16,000		4520	4690	4880	5220	5630	6110	6390	6780	7800				
	17,000		4630	4810	5010	5370	5810	6330	6630	7270	7940				
	18,000		4740	4930	5140	5530	6000	6560	7060	7830	8590				
	19,000		4850	5060	5280	5700	6190	7300	8030	8800	9740				
	20,000		4970	5190	5420	5860	6860	8280	9020	9870	11540				
	21,000		5250	5490	5750	6480	7680	9220	10040						
	22,000		5780	6040	6330	7170	8620	10220	11290						
	22,750		6190	6470	6780	7700	9400	11090	12620						
	23,000		6360	6650	6970	7930	9620	11410							
	23,500		6650	6960	7300	8310	9970	12110							
12,000	15,000		4810	5030	5280	5660	6110	6650	7000	7810					
	16,000		4930	5160	5430	5840	6320	6910	7550	8140					
	17,000		5050	5300	5590	6030	6550	7290	8110	8700					
	18,000		5180	5440	5750	6220	6780	8030	8770	9620					
	19,000		5310	5590	5920	6420	7530	9030	9860	11010					
	20,000		5450	5760	6300	7120	8510	10100	11170						
	21,000		5890	6380	7010	7960	9530	11410							
	22,000		6490	7050	7810	8940	10520								
	22,750		6980	7580	8480	9620	11420								
	23,000		7140	7820	8740	9950	11780								
	23,500		7550	8270	9240	10380	12490								
14,000	15,000		5360	5610	5910	6370	6920	7750	8320	9050					
	16,000		5510	5770	6100	6590	7190	8230	8900	9750					
	17,000		5660	5950	6290	6820	7460	8970	9580	10640					
	18,000		5820	6130	6490	7060	8350	9970	10960						
	19,000		5990	6330	6920	8010	9490	11340	13000						
	20,000		6510	7050	7780	8990	10610	13110							
	21,000		7220	7910	8750	10050	11950								
	22,000		8050	8830	9920	11170	13600								
	22,750		8670	9680	10470	12140									
	23,000		8970	9800	10720	12520									
	23,500		9560	10250	11300	13250									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-55.

Figure 5-54

TAKEOFF FIELD LENGTH
FLAPS — 20°
Rudder Boost — OFF

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

UNCORRECTED TAKEOFF FIELD LENGTH — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		3120	3210	3300	3400	3500	3610	3670	3770	3900	4050	4210	4390		
	16,000		3160	3260	3360	3470	3580	3700	3770	3870	4010	4170	4340	4540		
	17,000		3210	3320	3430	3550	3670	3790	3860	3970	4120	4290	4470	4690		
	18,000		3270	3390	3510	3640	3760	3890	3960	4080	4240	4410	4610	4840		
	19,000		3340	3470	3590	3720	3850	3990	4060	4180	4350	4540	4760	5210		
	20,000		3410	3550	3680	3810	3950	4090	4170	4290	4490	4860	5290	5820		
	21,000		3630	3780	3920	4070	4240	4410	4500	4670	4950	5370	5890	6510		
	22,000		3950	4120	4290	4460	4650	4840	4940	5140	5460	5950	6580	7400		
	22,750		4220	4400	4590	4770	4980	5190	5300	5510	5860	6420	7090	7850		
	23,000		4320	4510	4700	4890	5100	5310	5420	5650	6000	6600	7380	8050		
	23,100		4360	4550	4740	4930	5150	5360	5480	5700	6080	6640	7480	8140		
1000	15,000		3210	3300	3400	3510	3620	3730	3830	3950	4090	4250	4420	4620		
	16,000		3260	3360	3470	3590	3710	3830	3930	4060	4210	4380	4560	4780		
	17,000		3310	3430	3550	3670	3800	3930	4030	4170	4330	4510	4710	4940		
	18,000		3380	3510	3630	3760	3890	4030	4140	4280	4460	4650	4860	5110		
	19,000		3460	3590	3720	3850	3990	4130	4250	4400	4580	4790	5150	5460		
	20,000		3530	3670	3810	3950	4090	4240	4360	4530	4830	5250	5730	6380		
	21,000		3760	3910	4070	4220	4390	4580	4730	4990	5350	5830	6400	7200		
	22,000		4100	4280	4450	4630	4830	5030	5210	5500	5910	6500	7220	7920		
	22,750		4380	4570	4760	4960	5170	5390	5580	5900	6350	7030	7800	8580		
	23,000		4490	4680	4880	5080	5290	5510	5710	6040	6510	7200	7980	8940		
	23,100		4530	4720	4920	5120	5340	5580	5780	6100	6620	7310	8030	9070		
2000	15,000		3300	3400	3510	3630	3740	3860	3990	4140	4290	4460	4650	4870		
	16,000		3350	3470	3590	3710	3840	3960	4100	4260	4420	4600	4810	5040		
	17,000		3420	3550	3670	3800	3930	4070	4210	4380	4560	4750	4970	5250		
	18,000		3500	3630	3760	3900	4040	4180	4330	4510	4700	4900	5140	5540		
	19,000		3580	3710	3850	3990	4140	4280	4440	4640	4840	5110	5590	6170		
	20,000		3660	3800	3940	4090	4240	4400	4570	4840	5240	5700	6280	7030		
	21,000		3890	4050	4220	4380	4560	4750	4980	5350	5800	6340	7070	7780		
	22,000		4250	4440	4620	4810	5020	5220	5480	5900	6430	7070	7870	8760		
	22,750		4550	4750	4950	5150	5370	5600	5880	6360	6910	7790	8430	9790		
	23,000		4660	4860	5070	5280	5500	5730	6030	6520	7180	7990	8650	10300		
	23,100		4700	4910	5120	5320	5550	5800	6090	6580	7260	8040	8750	10440		
3000	15,000		3400	3510	3630	3750	3870	4040	4180	4340	4510	4710	4920	5170		
	16,000		3460	3590	3710	3840	3970	4150	4300	4470	4660	4870	5100	5400		
	17,000		3540	3670	3800	3940	4070	4270	4430	4610	4810	5030	5280	5620		
	18,000		3620	3750	3890	4030	4180	4380	4550	4750	4960	5200	5520	6130		
	19,000		3700	3840	3990	4140	4290	4500	4680	4890	5120	5580	6130	6940		
	20,000		3780	3930	4080	4240	4400	4620	4850	5240	5700	6240	6990	7740		
	21,000		4030	4200	4360	4530	4720	5030	5370	5810	6350	7000	7810	8810		
	22,000		4400	4600	4790	4980	5190	5540	5920	6440	7100	7930	8640	10440		
	22,750		4710	4920	5130	5330	5570	5940	6370	6920	7710	8440	9570	12910		
	23,000		4830	5040	5250	5470	5700	6100	6540	7120	8000	8650	9980			
	23,100		4870	5080	5300	5520	5750	6160	6600	7240	8100	8740	10090			
4000	15,000		3500	3620	3750	3880	4010	4230	4390	4570	4760	4980	5230			
	16,000		3580	3710	3840	3970	4110	4360	4530	4710	4920	5150	5420			
	17,000		3660	3790	3930	4070	4220	4480	4660	4860	5080	5330	5800			
	18,000		3740	3880	4030	4180	4330	4610	4800	5010	5250	5530	6130			
	19,000		3830	3980	4130	4290	4440	4740	4940	5170	5580	6130	6900			
	20,000		3910	4070	4230	4390	4560	4870	5230	5690	6240	6910	7750			
	21,000		4160	4340	4520	4700	4890	5340	5800	6340	6970	7870	8800			
	22,000		4560	4760	4960	5170	5380	5900	6400	7040	7920	8590	10060			
	22,750		4880	5100	5310	5540	5770	6330	6930	7620	8430	9300	11760			
	23,000		5000	5220	5450	5670	5910	6490	7100	7920	8640	9670	12730			
	23,100		5050	5270	5500	5720	5960	6550	7180	8020	8700	9820	13220			
5,000	15,000		3640	3770	3900	4030	4180	4450	4620	4810	5020	5260	5530			
	16,000		3720	3850	3990	4130	4290	4580	4770	4980	5200	5450	5880			
	17,000		3800	3950	4090	4240	4410	4720	4920	5140	5380	5710	6370			
	18,000		3890	4040	4200	4350	4530	4860	5070	5310	5560	6020	6730			
	19,000		3980	4140	4300	4460	4650	5000	5230	5570	6100	6780	7600			
	20,000		4070	4240	4410	4580	4770	5240	5690	6230	6860	7670	8400			
	21,000		4340	4530	4720	4910	5150	5800	6310	6940	7780	8460	9830			
	22,000		4770	4980	5190	5410	5670	6410	7040	7760	8540	9540	12270			
	22,750		5100	5330	5560	5790	6070	6880	7640	8470	9200	10750				
	23,000		5220	5450	5700	5940	6230	7110	7870	8640	9470	11280				
	23,100		5280	5520	5750	5990	6290	7180	7870	8730	9550	11540				
6,000	15,000		3780	3920	4050	4190	4360	4680	4870	5090	5320	5570				
	16,000		3860	4010	4150	4300	4480	4830	5030	5270	5510	5800				
	17,000		3950	4110	4260	4410	4610	4980	5200	5450	5710	6260				
	18,000		4050	4210	4370	4530	4730	5130	5360	5630	5950	6570				
	19,000		4140	4310	4480	4650	4860	5290	5550	6070	6660	7480				
	20,000		4240	4420	4590	4770	5000	5680	6190	6810	7600	8310				
	21,000		4520	4720	4920	5120	5400	6300	6920	7700	8440	9340				
	22,000		4970	5190	5410	5630	5950	6960	7760	8580	9340	11050				
	22,750		5320	5560	5790	6030	6390	7560	8470	9170	10220	13550				
	23,000		5450	5700	5950	6200	6540	7820	8670	9420	10620					
	23,100		5500	5750	6000	6250	6610	7920	8740	9530	10810					

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7000	15,000		3920	4070	4210	4360	4600	4950	5150	5390	5650	6030			
	16,000		4010	4170	4320	4480	4730	5110	5330	5580	5860	6470			
	17,000		4110	4270	4430	4600	4870	5270	5510	5780	6240	7050			
	18,000		4210	4380	4540	4720	5010	5440	5690	5990	6570	7400			
	19,000		4310	4480	4660	4840	5150	5610	6080	6690	7500	8230			
	20,000		4410	4590	4780	4970	5310	6210	6810	7620	8390	9330			
	21,000		4710	4920	5130	5360	5870	6930	7700	8510	9330	11230			
	22,000		5180	5420	5650	5890	6480	7730	8640	9350	10680	16860			
	22,750		5550	5800	6050	6320	6940	8450	9160	10140	12480				
	23,000		5680	5940	6190	6490	7160	8750	9390	10470	13500				
	23,100		5730	5990	6270	6550	7230	8780	9480	10590	13990				
8000	15,000		4080	4230	4380	4540	4860	5240	5470	5720	6010	6740			
	16,000		4170	4330	4490	4670	5000	5420	5660	5930	6420	7130			
	17,000		4270	4440	4610	4790	5150	5600	5860	6170	6870	7810			
	18,000		4370	4550	4730	4920	5310	5780	6060	6520	7320	8290			
	19,000		4480	4660	4850	5050	5470	6070	6670	7340	8270	9270			
	20,000		4590	4780	4980	5190	5730	6760	7520	8390	9220	11280			
	21,000		4890	5110	5330	5570	6350	7620	8560	9270	10690				
	22,000		5370	5620	5860	6130	7020	8620	9310	10370	13600				
	22,750		5760	6020	6280	6580	7570	9190	10050	11640					
	23,000		5890	6160	6450	6760	7810	9420	10360	12300					
	23,100		5940	6210	6510	6820	7860	9470	10470	12580					
9000	15,000		4230	4390	4560	4790	5130	5550	5800	6080	6610				
	16,000		4330	4500	4670	4930	5290	5740	6010	6320	7130				
	17,000		4440	4610	4800	5060	5460	5940	6230	6840	7490				
	18,000		4550	4730	4920	5200	5630	6140	6520	7270	8110				
	19,000		4660	4850	5050	5350	5800	6700	7360	8320	9060				
	20,000		4770	4970	5190	5500	6320	7570	8490	9180	10480				
	21,000		5110	5340	5580	6060	7020	8560	9290	10350	13200				
	22,000		5620	5880	6140	6690	7800	9420	10360	12210					
	22,750		6030	6300	6590	7170	8480	10140	11330						
	23,000		6160	6470	6770	7390	8770	10420	11700						
	23,100		6250	6540	6840	7470	8890	10540	11880						
10000	15,000		4400	4560	4740	5060	5430	5890	6160	6520	7200				
	16,000		4500	4680	4870	5210	5610	6100	6390	7020	7850				
	17,000		4610	4800	5000	5360	5790	6320	6730	7590	8190				
	18,000		4730	4920	5130	5520	5980	6550	7220	8120	8800				
	19,000		4840	5050	5270	5680	6190	7410	8280	8970	10170				
	20,000		4960	5180	5410	5900	6920	8400	9150	10140	12890				
	21,000		5290	5530	5790	6530	7760	9310	10250	11960					
	22,000		5830	6090	6380	7240	8720	10330	11590						
	22,750		6250	6530	6840	7790	9480	11250	13580						
	23,000		6390	6710	7040	7990	9660	11610							
	23,100		6480	6780	7110	8080	9730	11740							
12,000	15,000		4790	5020	5290	5650	6100	6650	7150	7750					
	16,000		4910	5160	5440	5830	6320	6950	7710	8260					
	17,000		5040	5300	5600	6020	6540	7460	8070	8870					
	18,000		5170	5440	5770	6220	6780	8010	8840	9750					
	19,000		5300	5600	5940	6420	7560	9100	9960	11470					
	20,000		5440	5770	6290	7160	8620	10200	11360						
	21,000		5940	6370	6990	8000	9580	11510							
	22,000		6540	7040	7750	9000	10600	13490							
	22,750		7040	7570	8390	9890	11480								
	23,000		7210	7800	8630	10040	11820								
	23,100		7270	7870	8730	10100	11970								
14,000	15,000		5350	5600	5900	6360	6900	7890	8470	9310					
	16,000		5490	5770	6090	6580	7170	8290	9080	10210					
	17,000		5650	5940	6290	6810	7440	8890	9700	10920					
	18,000		5810	6120	6490	7100	8480	10020	11140						
	19,000		5980	6360	6980	8010	9520	11460	13870						
	20,000		6520	7100	7770	9030	10660	13560							
	21,000		7280	7920	8810	10090	12020								
	22,000		8110	8920	9920	11230	13730								
	22,750		8790	9590	10480	12200									
	23,000		9060	9880	10770	12560									
	23,100		9170	9930	10870	12700									

ABOVE LIMITS

NOTE:
This table was prepared for zero wind, zero runway gradient, anti-ice off, anti-skid on & APR/autospoilers armed. For conditions other than these, apply the result from this table to the correction chart in figure 5-55.

Figure 5-54.1

EFFECTIVITY
All

TAKEOFF FIELD LENGTH CORRECTION CHART
FLAPS — 20°
Rudder Boost — OFF

EXAMPLE:

1. Uncorrected Takeoff Field Length (from table) ..... 7,500 Ft (2,286 M)
2. Headwind ..... 20 Kt
3. Runway Gradient Reference Line
4. Runway Gradient ..... -1.4% DN
5. Anti-Skid System Reference Line
6. Anti-Skid System ..... ON
7. Anti-Ice System Reference Line
8. Anti-Ice System ..... OFF
9. APR and Autospoilers Reference Line
10. APR and Autospoilers System ..... OFF
11. Altitude Reference Line
12. Altitude ..... 8,000 Ft
13. Corrected Takeoff Field Length .... 7,920 Ft (2,414 M)

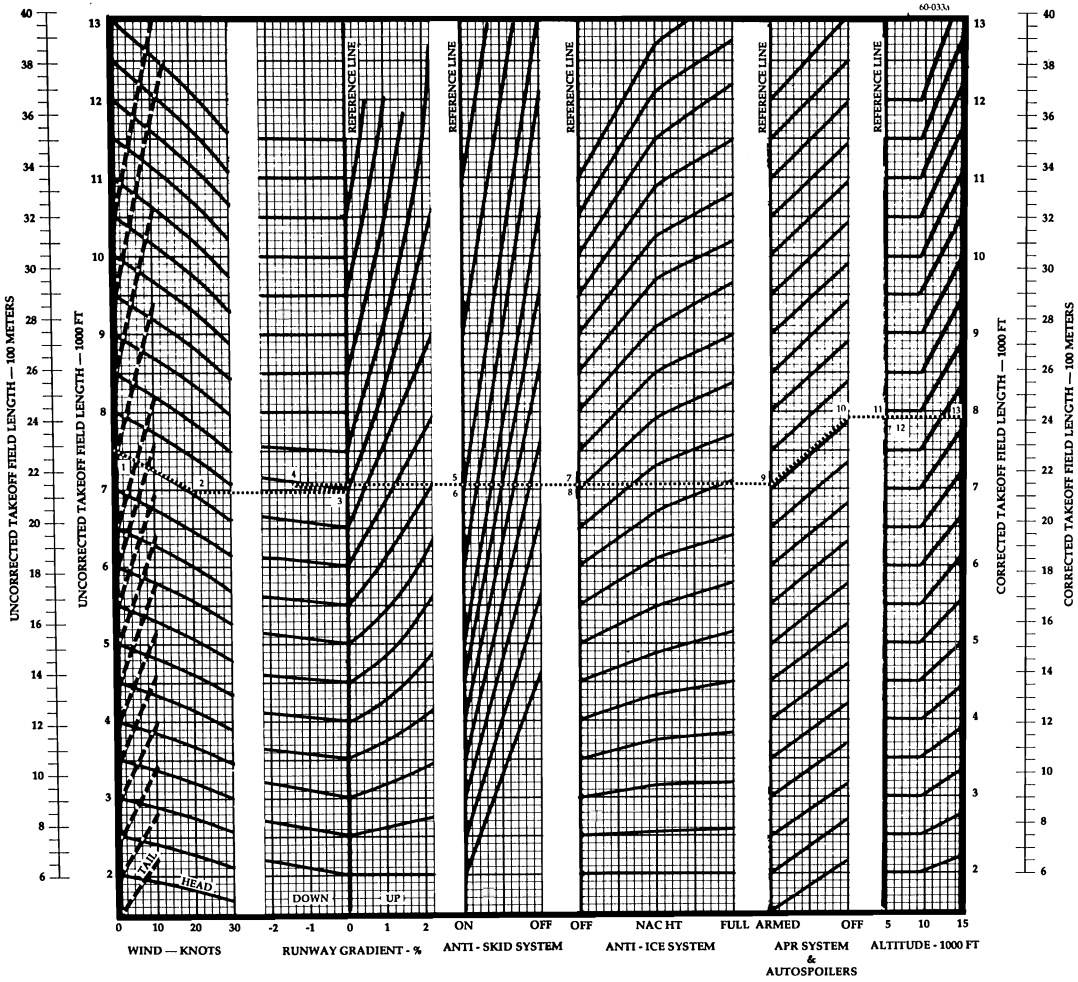


Figure 5-55

TAKEOFF SPEEDS
FLAPS — 20°
Rudder Boost — ON

EFFECTIVITY
All

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50	VR/V2 ~ KIAS VR	V2
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120				
SEA LEVEL	15,000		105	106	106	106	107	107	107	108	108	110	112	115			120	132
	16,000		107	108	108	108	109	109	109	110	110	112	114	116			120	132
	17,000		109	110	110	110	111	111	111	111	112	113	115	117			122	132
	18,000		112	112	113	113	113	113	113	113	113	114	116	118			125	133
	19,000		116	116	116	116	116	116	116	116	117	118	120	122			128	135
	20,000		120	120	120	120	120	120	120	120	120	122	124	126			131	138
	21,000		123	123	123	123	123	123	123	123	124	126	128	130			134	141
	22,000		127	127	127	127	127	127	127	127	128	130	132	135			136	143
	22,750		130	130	129	129	130	130	130	130	130	132	135	137			138	145
	23,000		131	131	131	130	131	131	130	131	131	134	137	138			139	146
	23,500		132	132	132	132	132	132	132	132	133	135	138	140			140	147
1000	15,000		105	106	106	107	107	108	108	108	110	112	114	116			120	132
	16,000		108	108	108	109	109	109	110	110	111	114	116	118			120	132
	17,000		109	110	110	110	111	111	111	112	113	114	117	119			122	132
	18,000		112	112	113	113	113	113	113	113	114	115	117	119			125	132
	19,000		116	116	116	116	116	116	116	117	117	119	121	123			128	135
	20,000		120	120	120	120	120	120	120	120	121	123	125	127			131	138
	21,000		123	123	123	123	123	123	123	124	125	127	129	132			134	141
	22,000		127	127	127	127	127	127	127	127	129	131	134	136			137	143
	22,750		130	129	129	129	129	129	130	130	131	134	137	138			138	145
	23,000		131	131	130	130	130	130	130	131	132	135	137	139			139	146
	23,500		132	132	132	132	132	132	133	134	137	139	140				140	147
2000	15,000		106	106	106	107	107	108	108	109	111	113	115	117			120	132
	16,000		108	108	108	109	109	109	110	111	113	114	117	119			120	132
	17,000		110	110	110	110	111	111	111	112	114	116	118	119			122	132
	18,000		112	113	113	113	113	113	113	114	115	116	118	120			125	132
	19,000		116	116	116	116	116	116	116	117	118	120	122	124			128	135
	20,000		120	120	120	120	120	120	120	121	122	124	126	129			131	138
	21,000		123	123	123	123	123	123	123	124	126	128	131	133			134	141
	22,000		127	127	127	127	127	127	127	128	130	132	135	136			137	144
	22,750		129	129	129	129	129	129	131	133	136	137	138	138			138	145
	23,000		131	130	130	130	130	130	130	132	134	137	138	139			139	146
	23,500		132	132	132	132	132	132	132	133	135	138	139	140			140	147
3000	15,000		106	106	107	107	107	108	109	110	113	114	117	119			120	132
	16,000		108	108	108	109	109	110	111	112	114	116	118	119			120	132
	17,000		110	110	110	110	111	111	112	113	115	117	119	122			122	132
	18,000		112	112	112	112	113	113	113	114	116	118	120	122			125	133
	19,000		116	116	116	116	116	116	117	118	120	121	123	127			128	135
	20,000		119	119	119	119	119	120	120	122	123	125	128	131			131	138
	21,000		123	123	123	123	123	123	124	126	128	130	133	133			134	141
	22,000		127	127	127	126	126	127	128	129	132	135	136	136			137	144
	22,750		129	129	129	129	129	129	130	132	135	137	138	138			138	145
	23,000		130	130	130	130	130	130	131	133	136	137	139				139	146
	23,500		132	132	132	131	132	132	133	135	138	139	140				140	147
4000	15,000		106	106	107	107	107	108	110	112	114	116	119				120	132
	16,000		108	108	109	109	109	110	112	113	116	117	119				120	132
	17,000		110	110	110	110	111	111	113	115	116	119	122				122	132
	18,000		112	112	112	112	112	113	114	115	117	119	122				125	133
	19,000		116	116	116	116	116	116	117	119	121	123	126				128	135
	20,000		119	119	119	119	119	120	121	123	125	127	130				131	138
	21,000		123	123	123	123	123	123	125	127	129	132	133				134	141
	22,000		127	126	126	126	126	127	129	131	134	135	136				137	144
	22,750		129	129	129	129	129	129	132	134	136	138	138				138	146
	23,000		130	130	130	130	130	130	132	135	137	139	139				139	146
	23,500		132	132	131	131	131	132	134	137	138	140	140				140	147
5000	15,000		106	106	107	107	108	109	111	113	115	118	119				120	132
	16,000		108	108	109	109	109	111	113	115	117	119	119				120	132
	17,000		110	110	110	110	110	112	114	116	118	120	122				123	132
	18,000		112	112	112	112	112	114	115	116	118	120	123				126	133
	19,000		116	116	116	116	116	117	118	120	122	125	128				129	135
	20,000		119	119	119	119	119	121	122	124	127	129	131				131	138
	21,000		123	123	123	123	123	124	126	128	131	133	134				134	141
	22,000		127	127	126	126	126	128	130	132	134	136	136				137	144
	22,750		129	129	129	129	129	131	133	136	137	138					139	146
	23,000		130	130	130	130	130	132	134	136	138	139					139	146
	23,500		132	132	131	131	131	133	135	137	139	140					140	148
6000	15,000		106	107	107	107	107	111	112	115	116	119					120	132
	16,000		108	109	109	109	109	112	114	116	119	119					120	132
	17,000		110	110	110	110	111	113	115	117	119	122					123	132
	18,000		112	112	112	112	112	114	116	117	119	122					126	133
	19,000		116	116	116	116	116	118	120	121	123	126					129	135
	20,000		119	119	119	119	119	122	123	126	128	130					131	138
	21,000		123	123	123	123	123	126	128	130	132	134					134	141
	22,000		126	126	126	126	126	129	132	134	135	136					137	144
	22,750		129	129	129	129	129	132	135	136	138	138					139	146
	23,000		130	130	130	130	130	134	136	137	139						139	146
	23,500		132	131	131	131	131	135	137	138	140						140	148

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only.

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	VR/V2 ~ KIAS VR	V2
		°F	-40	-20	0	20	40	60	70	80	90	100	110				
7000	15,000		106	107	107	107	108	112	114	116	118	119				120	133
	16,000		108	108	109	109	110	113	115	118	119	119				120	133
	17,000		110	110	110	110	111	114	116	118	121	122				123	133
	18,000		112	112	112	112	113	115	117	119	121	124				126	133
	19,000		116	116	116	116	116	119	121	123	126	127				129	136
	20,000		119	119	119	119	120	123	125	128	130	131				132	139
	21,000		123	123	123	123	124	127	130	132	133	134				135	141
	22,000		127	126	126	126	127	131	134	135	137					137	144
	22,750		129	129	129	129	130	134	135	137	139					139	146
	23,000		130	130	130	130	131	136	136	139	139					140	147
	23,500		132	132	131	131	132	137	138	140	141					141	148
8000	15,000		106	106	107	107	109	113	115	118	119	119				120	133
	16,000		108	108	108	108	111	114	117	119	119	119				120	133
	17,000		110	110	110	110	112	115	117	119	122	122				123	133
	18,000		112	112	112	112	113	116	118	120	123	125				126	133
	19,000		115	115	115	115	117	120	122	124	127	128				129	136
	20,000		119	119	119	119	121	124	127	129	131	131				132	139
	21,000		123	122	122	122	124	128	132	132	134					135	142
	22,000		126	126	126	126	128	133	134	136	137					137	144
	22,750		129	129	128	128	130	135	136	139						139	146
	23,000		130	130	130	129	132	136	137	139						140	147
	23,500		131	131	131	131	133	137	139	141						141	148
9000	15,000		106	106	106	107	110	114	116	119	119					120	133
	16,000		108	108	108	109	112	116	119	120	120					120	133
	17,000		109	109	110	110	113	117	119	121	123					123	133
	18,000		112	112	112	112	114	118	120	122	125					127	133
	19,000		116	116	115	116	118	122	124	127	128					130	136
	20,000		119	119	119	120	122	126	129	130	132					132	139
	21,000		123	123	123	123	126	131	132	134	135					135	142
	22,000		126	126	126	127	130	134	136	137						138	145
	22,750		129	129	129	129	133	136	139							140	147
	23,000		130	130	130	131	134	137	140							140	148
	23,500		132	131	131	132	136	139	141							142	149
10000	15,000		106	106	106	108	112	115	118	119	119					120	133
	16,000		108	108	108	109	113	118	120	120	120					120	133
	17,000		109	109	109	111	114	118	120	123	123					124	133
	18,000		112	112	112	113	115	119	121	124	125					127	133
	19,000		115	115	115	116	120	123	126	127	129					130	136
	20,000		119	119	119	120	123	128	129	132	132					132	139
	21,000		122	122	122	124	128	131	133	135						135	142
	22,000		126	126	126	127	132	135	137							138	145
	22,750		129	128	128	130	135	137	139							140	147
	23,000		129	130	129	131	135	138								140	148
	23,500		131	131	131	132	136	140								142	149
12,000	15,000		106	107	108	111	115	119	119	119						120	133
	16,000		108	109	110	112	115	120	120	120						121	133
	17,000		109	110	111	113	116	121	122	124						124	133
	18,000		112	113	114	115	119	122	124	126						128	134
	19,000		116	116	117	119	123	127	128	130						131	137
	20,000		120	120	121	123	128	130	133							134	140
	21,000		123	124	125	127	131	134								136	143
	22,000		127	127	129	131	134	139								139	146
	22,750		130	130	131	135	137									141	148
	23,000		130	131	132	135	138									142	149
	23,500		132	134	136	136	139									143	150
14,000	15,000		108	110	111	113	118	119	119	119						120	133
	16,000		110	111	112	115	119	122	122	122						123	133
	17,000		111	112	113	115	118	122	124	126						126	133
	18,000		115	116	117	120	124	126	128							129	136
	19,000		119	120	122	124	127	131	132							132	139
	20,000		123	124	125	128	131	135								135	142
	21,000		127	128	130	132	135									138	145
	22,000		131	132	134	135										141	148
	22,750		134	135	135	137										143	150
	23,000		135	136	136	138										144	151
	23,500		137	137	138	140										145	152

ABOVE LIMITS

NOTE:
- This table was prepared for zero runway gradient, anti-ice off & anti-skid on. For conditions other than these, apply the result from this table to the correction chart in Figure 5-57.
- The V1 determined from this figure must not exceed the VR determined from this figure. If V1 exceeds VR, reduce V1 to VR.

Figure 5-56

EFFECTIVITY
All

TAKEOFF SPEEDS CORRECTION CHART
FLAPS — 20°
Rudder Boost — ON

EXAMPLE:

1. Uncorrected V1 ..... 122 KIAS
2. Runway Gradient Reference Line
3. Runway Gradient ..... -1.4% DN
4. Anti-Ice System Reference Line
5. Anti-Ice System ..... OFF
6. Anti-Skid System Reference Line
7. Anti-Skid System ..... ON
8. Corrected V1 ..... 119 KIAS

NOTE:

The V1 determined from this figure must not exceed VR. If V1 exceeds VR, reduce V1 to VR.

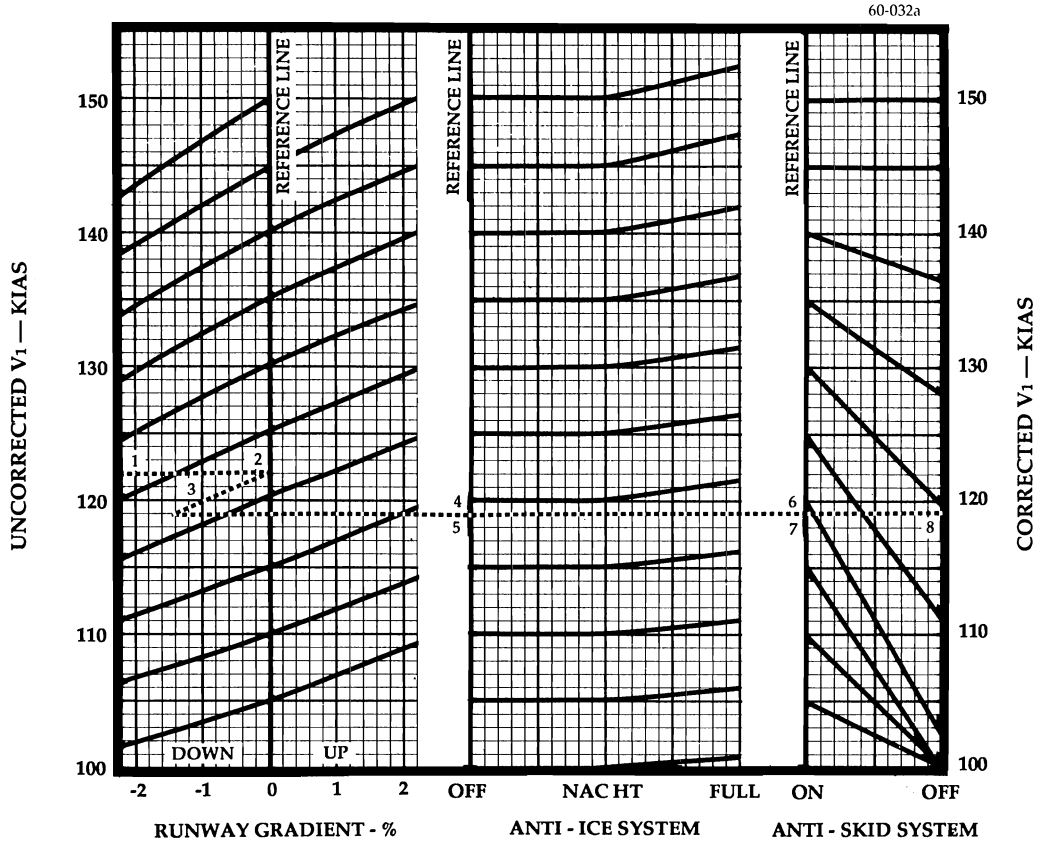


Figure 5-57

TAKEOFF SPEEDS
FLAPS — 20°
Rudder Boost — OFF

EFFECTIVITY
All

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C -40 -30 -20 -10 0 10 15 20 25 30 35 40 45 50 / °F -40 -20 0 20 40 60 70 80 90 100 110 120	VR	V2
SEA LEVEL	15,000	123 123 123 123 123 122 122 122 122 121 121 120	124	132
	16,000	123 123 122 122 122 122 122 121 121 121 120 120	124	132
	17,000	122 122 122 122 122 122 121 121 121 120 120 120	124	132
	18,000	122 122 122 121 121 121 121 121 121 120 120 119	125	133
	19,000	121 121 121 121 121 121 121 121 120 120 120 122	128	135
	20,000	121 121 121 121 121 121 121 120 120 122 124 126	131	138
	21,000	123 123 123 123 123 123 123 123 124 126 128 130	134	141
	22,000	127 127 127 127 127 127 127 127 128 130 132 135	136	143
	22,750	130 130 130 129 130 130 130 130 130 133 135 137	138	145
	23,000	131 131 131 130 131 131 131 131 134 137 138	139	146
	23,500	132 132 132 132 132 132 132 132 133 135 138 140	140	147
1000	15,000	123 123 123 123 122 122 122 122 121 121 120 120	124	132
	16,000	123 122 122 122 122 122 122 121 121 120 120 120	124	132
	17,000	122 122 122 122 122 121 121 121 121 120 120 119	124	132
	18,000	122 122 121 121 121 121 121 121 120 120 120 119	125	132
	19,000	121 121 121 121 121 121 121 120 120 120 121 123	128	135
	20,000	121 121 121 121 121 121 120 120 121 123 125 128	131	138
	21,000	123 123 123 123 123 123 123 124 125 127 129 134	134	141
	22,000	127 127 127 127 127 127 127 128 129 131 134 136	137	143
	22,750	130 130 129 129 130 130 130 130 132 134 137 138	138	145
	23,000	131 131 131 130 130 130 130 131 132 135 137 139	139	146
	23,500	132 132 132 132 132 132 132 133 134 137 139 140	140	147
2000	15,000	123 123 123 122 122 122 122 121 121 120 120 120	124	132
	16,000	122 122 122 122 122 122 121 121 121 120 120 119	124	132
	17,000	122 122 122 122 121 121 121 121 120 120 120 120	124	132
	18,000	122 121 121 121 121 121 121 120 120 120 119 120	125	132
	19,000	121 121 121 121 121 121 120 120 120 120 122 124	128	135
	20,000	121 121 121 121 121 120 120 121 122 124 126 129	131	138
	21,000	123 123 123 123 123 123 123 124 126 128 131 133	134	141
	22,000	127 127 127 127 127 127 127 128 130 132 135 136	137	144
	22,750	130 129 129 129 129 129 131 133 136 137 138 138	138	145
	23,000	131 131 130 130 130 130 131 132 134 137 138 139	139	146
	23,500	132 132 132 132 132 132 132 133 135 138 139 140	140	147
3000	15,000	123 123 122 122 122 122 121 121 121 120 120 119	124	132
	16,000	122 122 122 122 122 121 121 121 120 120 120 119	124	132
	17,000	122 122 122 122 121 121 121 120 120 120 119 121	124	132
	18,000	122 121 121 121 121 121 120 120 120 119 120 122	125	133
	19,000	121 121 121 121 121 120 120 120 119 121 123 127	128	135
	20,000	121 121 121 121 120 120 120 122 123 125 128 131	131	138
	21,000	123 123 123 123 123 123 124 126 128 130 133 133	134	141
	22,000	127 127 127 127 127 127 128 129 132 135 136 136	137	144
	22,750	129 129 129 129 129 129 130 132 135 137 138 138	138	145
	23,000	130 130 130 130 130 130 131 133 136 137 139	139	146
	23,500	132 132 132 131 132 132 133 135 138 139 140	140	147
4000	15,000	123 123 122 122 122 121 121 121 120 120 119	124	132
	16,000	122 122 122 122 122 121 121 120 120 120 119	124	132
	17,000	122 122 122 121 121 121 120 120 120 119 121	124	132
	18,000	121 121 121 121 121 120 120 120 119 119 122	125	133
	19,000	121 121 121 121 121 120 120 120 121 123 126	128	135
	20,000	121 121 121 121 120 120 121 123 125 127 130	131	138
	21,000	123 123 123 123 123 123 125 127 129 132 133	134	141
	22,000	126 127 126 126 126 127 129 131 134 135 138	137	144
	22,750	129 129 129 129 129 130 132 134 136 138 138	138	145
	23,000	130 130 130 130 130 130 132 135 137 139 139	139	146
	23,500	132 132 131 131 131 132 134 137 138 140 140	140	147
5000	15,000	123 122 122 122 122 121 121 120 120 120 119	124	132
	16,000	122 122 122 122 121 121 120 120 120 119 120	124	132
	17,000	122 122 121 121 121 120 120 120 119 120 122	124	132
	18,000	121 121 121 121 121 120 120 120 119 120 123	126	133
	19,000	121 121 121 121 121 120 120 120 122 125 128	129	135
	20,000	121 121 121 120 120 121 122 124 127 129 131	131	138
	21,000	123 123 123 123 123 124 126 128 131 133 134	134	141
	22,000	127 127 126 126 126 128 130 132 134 136 136	137	144
	22,750	129 129 129 129 129 131 133 136 137 138	139	146
	23,000	130 130 130 130 130 132 134 136 138 139	139	146
	23,500	132 132 132 131 131 133 135 138 139 140	140	148
6000	15,000	122 122 122 122 122 121 120 120 120 119	124	132
	16,000	122 122 122 122 121 120 120 120 119 119	124	132
	17,000	122 121 121 121 121 120 120 119 119 121	124	132
	18,000	121 121 121 121 121 120 120 119 119 122	126	133
	19,000	121 121 121 121 120 120 120 121 123 126	129	135
	20,000	121 121 120 120 120 122 124 126 128 130	131	138
	21,000	123 123 123 123 123 126 128 130 132 134	134	141
	22,000	127 126 126 126 126 129 132 134 135 136	137	144
	22,750	129 129 129 129 129 132 135 136 138 138	139	146
	23,000	130 130 130 130 130 134 136 137 139	139	146
	23,500	132 132 131 131 131 135 137 138 140	140	148

ABOVE LIMITS

ALT FT	WT LB	V1 ~ KIAS TEMPERATURE °C -40 -30 -20 -10 0 10 15 20 25 30 35 40 45 / °F -40 -20 0 20 40 60 70 80 90 100 110	VR	V2
7000	15,000	122 122 122 122 121 121 120 120 119 120	124	133
	16,000	122 122 122 121 121 120 120 119 119 121	124	133
	17,000	122 121 121 121 121 120 120 119 120 124	124	133
	18,000	121 121 121 121 120 120 119 119 121 124	126	133
	19,000	121 121 121 121 120 119 121 123 126 128	129	136
	20,000	121 121 120 120 120 123 125 128 130 131	132	139
	21,000	123 123 123 123 124 127 130 132 133 134	135	141
	22,000	127 126 126 126 127 131 134 135 137 137	137	144
	22,750	129 129 129 129 130 134 136 137 139	139	146
	23,000	130 130 130 130 131 136 136 139 139	140	147
	23,500	132 132 131 131 132 137 138 140 141	141	148
8000	15,000	122 122 122 122 121 120 120 120 119 122	124	133
	16,000	122 122 122 121 121 120 120 119 120 123	124	133
	17,000	121 121 121 121 120 120 119 119 122 124	124	133
	18,000	121 121 121 121 120 119 119 120 123 125	126	133
	19,000	121 121 121 120 120 120 122 124 127 126	129	136
	20,000	121 120 120 120 121 124 127 129 131 131	132	139
	21,000	123 122 122 122 124 128 132 132 134	135	142
	22,000	126 126 126 126 128 133 134 136 137	137	144
	22,750	129 129 129 128 130 135 136 139	139	146
	23,000	130 130 130 129 132 136 137 139	140	147
	23,500	132 131 131 131 133 137 139 141	141	148
9000	15,000	122 122 122 121 121 120 120 119 121	124	133
	16,000	122 122 122 121 120 120 119 119 122	124	133
	17,000	121 121 121 121 120 119 119 121 123	124	133
	18,000	121 121 121 120 120 119 119 122 125	127	133
	19,000	121 121 121 120 120 122 124 127 128	130	136
	20,000	121 120 120 120 122 126 129 130 132	132	139
	21,000	123 123 123 123 126 131 132 134 135	135	142
	22,000	126 126 126 127 130 134 136 137	138	145
	22,750	129 129 129 129 133 136 139	140	147
	23,000	130 130 130 131 134 137 140	140	148
	23,500	132 131 131 132 136 139 141	142	149
10000	15,000	122 122 122 121 120 120 119 119 122	124	133
	16,000	122 122 121 121 120 119 119 121 122	124	133
	17,000	121 121 121 120 120 119 120 123 124	124	133
	18,000	121 121 121 120 120 119 121 124 125	127	133
	19,000	121 121 121 120 119 123 126 127 129	130	136
	20,000	121 120 120 120 124 128 129 131 132	132	139
	21,000	122 122 122 124 128 131 133 135	135	142
	22,000	126 126 126 127 132 135 137	138	145
	22,750	129 128 128 130 135 137 139	140	147
	23,000	130 130 129 131 135 138	140	148
	23,500	131 131 131 132 136 140	142	149
12,000	15,000	122 122 121 120 120 119 120 121	124	133
	16,000	122 121 121 120 120 119 122 122	124	133
	17,000	121 121 120 120 119 121 122 124	124	133
	18,000	121 121 120 120 119 122 124 126	128	134
	19,000	121 120 120 119 123 127 128 130	131	137
	20,000	120 120 121 123 128 131 133	134	140
	21,000	123 124 125 127 131 134	136	143
	22,000	127 127 129 131 134 139	139	146
	22,750	130 130 131 135 137	141	148
	23,000	130 131 132 135 138	142	149
	23,500	132 134 136 136 139	143	150
14,000	15,000	121 121 120 120 119 121 122 123	124	133
	16,000	121 121 120 120 119 121 123 124	124	133
	17,000	121 120 120 119 119 122 124 126	126	133
	18,000	120 120 120 120 124 126 128	129	136
	19,000	120 120 122 124 127 131 132	132	139
	20,000	123 124 125 128 131 135	135	142
	21,000	127 128 130 132 135	138	145
	22,000	131 132 134 135 139	141	148
	22,750	134 135 135 137	143	150
	23,000	135 136 136 138	144	151
	23,500	137 137 138 140	145	152

ABOVE LIMITS

NOTE:
- This table was prepared for zero runway gradient & anti-ice off. For conditions other than these, apply the result from this table to the correction chart in Figure 5-59.
- The V1 determined from this figure must not exceed the VR determined from this figure. If V1 exceeds VR, reduce V1 to VR.

Figures in shaded area are above engine temperature limits and are provided for interpolation only.

Figure 5-58

EFFECTIVITY
All

TAKEOFF SPEEDS CORRECTION CHART
FLAPS — 20°
Rudder Boost — OFF

EXAMPLE:

1. Uncorrected V1 . . . . . 122 KIAS
2. Runway Gradient Reference Line
3. Runway Gradient . . . . . -1.4% DN
4. Anti-Ice System Reference Line
5. Anti-Ice System . . . . . OFF
6. Corrected V1 . . . . . 120 KIAS

NOTE:

The V1 determined from this figure must not exceed VR. If V1 exceeds VR, reduce V1 to VR.

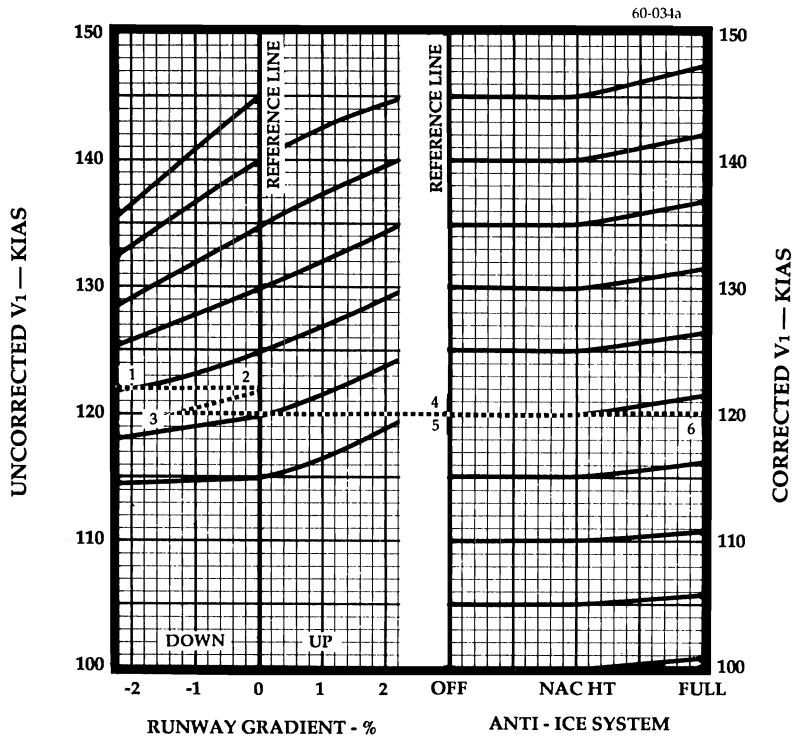


Figure 5-59

UNCORRECTED FIRST SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40		-20		0	20	40	60	70	80	90	100	110	120
SEA LEVEL	15,000	12.6	12.6	12.6	12.5	12.4	12.3	12.3	12.2	11.7	10.4	9.0	7.7		
	16,000	11.1	11.1	11.1	11.1	11.0	10.9	10.8	10.8	10.3	9.1	7.8	6.6		
	17,000	9.8	9.8	9.8	9.8	9.7	9.6	9.5	9.5	9.1	7.9	6.7	5.5		
	18,000	8.6	8.6	8.6	8.6	8.5	8.4	8.4	8.3	8.0	6.8	5.7	4.6		
	19,000	7.4	7.4	7.4	7.4	7.3	7.2	7.2	7.1	6.8	5.7	4.7	3.6		
	20,000	6.3	6.3	6.3	6.3	6.2	6.2	6.1	6.1	5.7	4.7	3.7	2.8		
	21,000	5.4	5.4	5.4	5.3	5.3	5.2	5.2	5.1	4.8	3.8	2.9	2.0		
	22,000	4.5	4.5	4.5	4.5	4.4	4.3	4.3	4.2	3.9	3.0	2.2	1.3		
	22,750	3.9	3.9	3.9	3.9	3.8	3.7	3.7	3.6	3.4	2.5	1.6	0.8		
	23,000	3.7	3.7	3.7	3.7	3.6	3.5	3.5	3.5	3.2	2.3	1.5	0.6		
	23,500	3.3	3.3	3.3	3.3	3.2	3.2	3.1	3.1	2.8	2.0	1.1	0.3		
2000	15,000	12.4	12.4	12.4	12.4	12.2	12.1	12.1	11.2	9.9	8.6	7.4	6.1		
	16,000	11.0	11.0	10.9	10.9	10.8	10.7	10.7	9.9	8.7	7.5	6.3	5.1		
	17,000	9.7	9.7	9.7	9.6	9.5	9.4	9.4	8.6	7.5	6.4	5.3	4.2		
	18,000	8.5	8.5	8.5	8.5	8.4	8.3	8.2	7.5	6.5	5.4	4.4	3.3		
	19,000	7.3	7.3	7.3	7.3	7.2	7.1	7.1	6.4	5.4	4.4	3.4	2.4		
	20,000	6.2	6.2	6.2	6.2	6.1	6.0	6.0	5.4	4.4	3.5	2.5	1.5		
	21,000	5.3	5.3	5.2	5.2	5.2	5.1	5.0	4.4	3.5	2.7	1.8	0.9		
	22,000	4.4	4.4	4.4	4.4	4.3	4.2	4.2	3.6	2.7	1.9	1.1	0.2		
	22,750	3.8	3.8	3.8	3.8	3.7	3.6	3.6	3.0	2.2	1.4	0.6	-0.2		
	23,000	3.6	3.6	3.6	3.6	3.5	3.4	3.4	2.8	2.0	1.2	0.4	-0.4		
	23,500	3.2	3.2	3.2	3.2	3.1	3.1	3.0	2.5	1.7	0.9	0.1	-0.8		
4000	15,000	12.4	12.4	12.4	12.4	12.2	12.1	10.7	9.3	8.0	6.8	5.6			
	16,000	11.0	11.0	11.0	10.9	10.8	10.6	9.3	8.1	6.9	5.8	4.6			
	17,000	9.7	9.7	9.7	9.6	9.5	9.4	8.2	6.9	5.9	4.8	3.7			
	18,000	8.5	8.5	8.5	8.5	8.4	8.2	7.1	5.9	4.9	3.9	2.9			
	19,000	7.3	7.3	7.3	7.3	7.2	7.0	6.0	4.9	3.9	3.0	2.0			
	20,000	6.2	6.2	6.2	6.2	6.1	6.0	4.9	3.9	3.0	2.1	1.2			
	21,000	5.3	5.2	5.2	5.2	5.1	5.0	4.0	3.1	2.2	1.4	0.5			
	22,000	4.4	4.4	4.4	4.4	4.3	4.1	3.2	2.3	1.5	0.7	-0.1			
	22,750	3.8	3.8	3.8	3.8	3.7	3.5	2.7	1.8	1.0	0.2	-0.5			
	23,000	3.6	3.6	3.6	3.6	3.5	3.4	2.5	1.6	0.8	0.1	-0.7			
	23,500	3.2	3.2	3.2	3.2	3.1	3.0	2.1	1.3	0.5	-0.2				
6000	15,000	12.2	12.1	12.1	12.1	12.1	10.0	8.8	7.5	6.3	5.1				
	16,000	10.8	10.7	10.7	10.7	10.6	8.7	7.6	6.4	5.3	4.2				
	17,000	9.5	9.5	9.4	9.4	9.4	7.6	6.5	5.4	4.4	3.3				
	18,000	8.3	8.3	8.3	8.3	8.2	6.5	5.5	4.5	3.5	2.5				
	19,000	7.1	7.1	7.1	7.1	7.0	5.4	4.5	3.5	2.6	1.7				
	20,000	6.1	6.0	6.0	6.0	6.0	4.4	3.5	2.7	1.8	0.9				
	21,000	5.1	5.1	5.1	5.1	5.0	3.6	2.7	1 9	1.0	0.2				
	22,000	4.2	4.2	4.2	4.2	4.2	2.8	2.0	1.2	0.4	-0.4				
	22,750	3.6	3.6	3.6	3.6	3.6	2.2	1.5	0.7	-0.1					
	23,000	3.4	3.4	3.4	3.4	3.4	2.1	1.3	0.5	-0.2					
	23,500	3.1	3.1	3.1	3.1	3.0	1.7	1.0	0.2	-0.5					
8000	15,000	12.2	12.2	12.2	12.2	10.7	8.1	7.0	5.9	4.8	3.7				
	16,000	10.8	10.8	10.8	10.7	9.4	6.9	5.9	4.9	3.8	2.8				
	17,000	9.5	9.5	9.5	9.5	8.2	5.9	4.9	4.0	3.0	2.0				
	18,000	8.3	8.3	8.3	8.3	7.1	4.9	4.0	3.1	2.2	1.3				
	19,000	7.1	7.1	7.1	7.1	6.0	3.9	3.1	2.2	1.4	0.5				
	20,000	6.1	6.0	6.0	6.0	5.0	3.0	2.2	1.4	0.6	-0.2				
	21,000	5.1	5.1	5.1	5.1	4.1	2.2	1.5	0.7	-0.1					
	22,000	4.2	4.2	4.2	4.2	3.2	1.5	0.8	0.0	-0.7					
	22,750	3.6	3.6	3.6	3.6	2.7	1.0	0.3	-0.4						
	23,000	3.4	3.4	3.4	3.4	2.5	0.8	0.2	-0.5						
	23,500	3.1	3.1	3.0	3.0	2.2	0.5	-0.1							
10000	15,000	12.3	12.3	12.3	11.1	8.7	6.5	5.4	4.3	3.2					
	16,000	10.9	10.9	10.8	9.8	7.6	5.5	4.4	3.4	2.4					
	17,000	9.6	9.6	9.6	8.5	6.5	4.5	3.5	2.6	1.6					
	18,000	8.4	8.4	8.3	7.4	5.4	3.6	2.7	1.8	0.9					
	19,000	7.2	7.2	7.1	6.2	4.4	2.7	1.8	1.0	0.1					
	20,000	6.1	6.1	6.1	5.2	3.5	1.9	1.0	0.2	-0.8					
	21,000	5.1	5.1	5.1	4.3	2.7	1.1	0.3	-0.4						
	22,000	4.2	4.2	4.2	3.5	1.9	0.5	-0.3							
	22,750	3.6	3.6	3.6	2.9	1.4	0.0	-0.7							
	23,000	3.4	3.4	3.4	2.7	1.2	-0.2								
	23,500	3.1	3.1	3.1	2.4	0.9	-0.4								
12000	15,000	11.9	11.0	10.0	9.0	6.8	4.7	3.7	2.7						
	16,000	10.5	9.6	8.7	7.8	5.8	3.8	2.9	1.9						
	17,000	9.2	8.4	7.6	6.7	4.8	3.0	2.1	1.2						
	18,000	8.0	7.2	6.4	5.6	3.8	2.1	1.3	0.4						
	19,000	6.8	6.1	5.3	4.6	2.9	1.3	0.5	-0.3						
	20,000	5.8	5.1	4.4	3.7	2.0	0.5	-0.2							
	21,000	4.8	4.2	3.5	2.8	1.3	-0.2								
	22,000	4.0	3.3	2.7	2.1	0.6	-0.8								
	22,750	3.4	2.8	2.2	1.6	0.2	-1.2								
	23,000	3.2	2.6	2.0	1.4	0.0	-1.3								
	23,500	2.8	2.2	1.7	1.1	-0.3									
14000	15,000	10.0	9.2	8.4	7.0	5.2	3.3	2.3	1.4						
	16,000	8.8	8.0	7.2	5.9	4.2	2.4	1.5	0.7						
	17,000	7.6	6.9	6.1	5.0	3.3	1.7	0.8	0.0						
	18,000	6.4	5.7	5.0	3.9	2.4	0.8	0.0	-0.8						
	19,000	5.3	4.7	4.0	3.0	1.5	0.0	-0.7							
	20,000	4.4	3.8	3.1	2.1	0.8	-0.8								
	21,000	3.5	2.9	2.3	1.4	0.1	-1.2								
	22,000	2.8	2.2	1.6	0.7	-0.5									
	22,750	2.2	1.7	1.1	0.2	-1.0									
	23,000	2.1	1.5	1.0	0.1	-1.1									
	23,500	1.7	1.2	0.7	-0.2										

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... DOWN
- Flaps ..... 20°
- Speed ..... VLOF

FIRST SEGMENT CLIMB GRADIENT
FLAPS — 20°

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

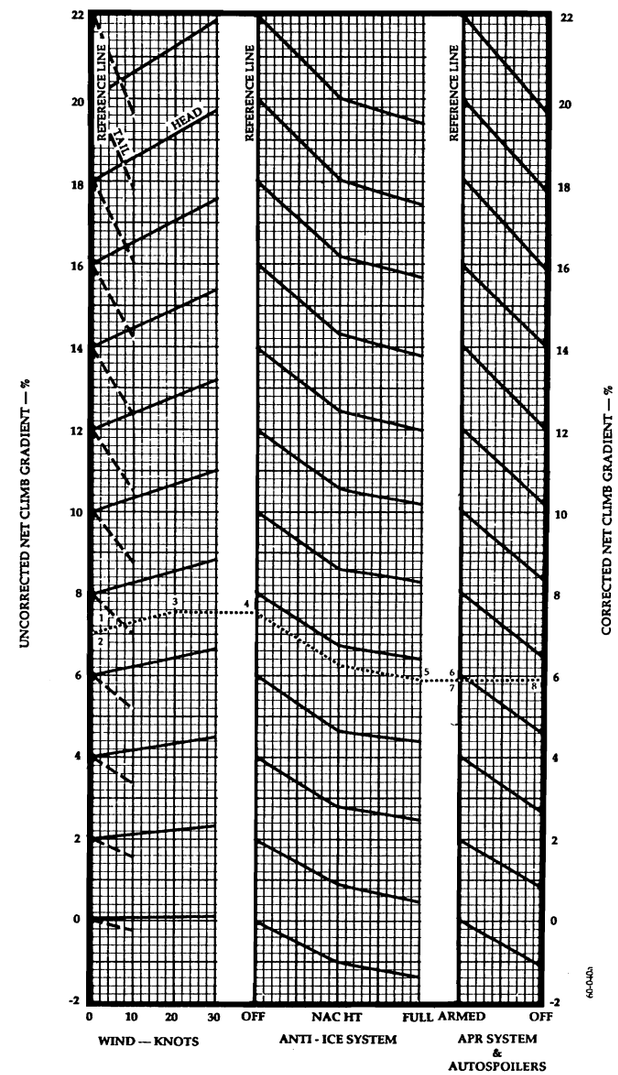


Figure 5-60

FIRST SEGMENT CLIMB GRADIENT
FLAPS — 20°

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

UNCORRECTED FIRST SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	12.1	12.1	12.1	12.0	11.9	11.8	11.7	11.7	11 2	9.9	8.6	7.3		
	16,000	10.7	10.7	10.7	10.6	10.5	10.4	10.4	10.3	9.9	8.7	7.4	6.2		
	17,000	9.4	9.4	9.4	9.4	9.3	9.2	9.1	9.0	8.7	7.5	6.4	5.2		
	18,000	8.2	8.2	8.2	8.2	8.1	8.0	8.0	7.9	7.6	6.5	5.4	4.3		
	19,000	7.1	7.1	7.0	7 0	6.9	6.8	6.8	6.7	6.4	5.4	4.4	3.4		
	20,000	6.0	6.0	6.0	6.0	5.9	5.8	5.8	5.7	5.4	4.4	3.5	2.5		
	21,000	5.0	5.0	5.0	5.0	4.9	4.9	4.8	4.8	4.4	3.5	2.6	1.7		
	22,000	4.2	4.2	4.2	4.2	4.1	4.0	4.0	3.9	3.6	2.8	1.9	1.0		
	22,750	3.6	3.6	3.6	3.6	3.5	3.4	3.4	3.3	3.0	2.2	1.4	0 5		
	23,000	3.4	3.4	3.4	3.4	3.3	3.2	3.2	3.2	2.8	2.0	1.2	0.4		
	23,100	3.3	3.3	3.3	3.3	3.2	3.2	3.1	3.1	2.8	2.0	1.1	0.3		
2000	15,000	11.9	11.9	11.9	11.9	11.8	11.7	11.6	10.8	9 5	8.3	7.0	5.8		
	16,000	10.5	10.5	10.5	10.5	10.4	10.3	10.2	9.5	8.3	7.1	5.9	4.8		
	17,000	9.3	9.3	9.2	9.2	9.1	9.0	9.0	8.3	7.2	6.1	5.0	3.8		
	18,000	8.1	8.1	8 1	8.1	8.0	7.9	7.9	7.2	6.1	5.1	4.1	3.0		
	19,000	7.0	6.9	6.9	6.9	6.8	6.8	6.7	6.1	5.1	4.1	3.1	2.2		
	20,000	5.9	5.9	5.9	5.9	5.8	5.7	5.7	5.0	4.1	3.2	2.3	1.4		
	21,000	5.0	4.9	4.9	4.9	4.9	4.8	4.8	4.1	3.3	2.4	1.5	0.7		
	22,000	4.1	4.1	4.1	4.1	4.0	3.9	3.9	3.3	2.5	1.7	0.8	0.0		
	22,750	3.5	3.5	3.5	3.5	3.4	3.4	3.3	2.7	2.0	1.2	0.4	-0.4		
	23,000	3.3	3.3	3.3	3.3	3.2	3.2	3.1	2.6	1.8	1.0	0.2	-0.6		
	23,100	3.2	3.2	3.2	3.2	3.2	3.1	3.1	2.5	1.7	0.9	0.1	-0.6		
4000	15,000	11.9	11.9	11.9	11.9	11.8	11.5	10.2	8.9	7.6	6.4	5.1			
	16,000	10.5	10.5	10.5	10.5	10.4	10.1	8 9	7 7	6.5	5.3	4.2			
	17,000	9.3	9.3	9.3	9.2	9.2	8.9	7.7	6 6	5.5	4.4	3.3			
	18,000	8.1	8.1	8.1	8.1	8 0	7.7	6.7	5.6	4.6	3.5	2.5			
	19,000	7.0	7.0	6.9	6.9	6.9	6.6	5.6	4.6	3.6	2.6	1.7			
	20,000	5.9	5.9	5.9	5.9	5.8	5.6	4.6	3.7	2.7	1.8	0.9			
	21,000	5.0	4.9	4 9	4.9	4.9	4.6	3.7	2.8	1.9	1.1	0.2			
	22,000	4.1	4.1	4.1	4.1	4.0	3.8	2.9	2.1	1.2	0.4	-0.4			
	22,750	3.5	3.5	3.5	3.5	3.4	3.2	2.4	1.5	0.7	-0.1				
	23,000	3.3	3.3	3.3	3.3	3.3	3.0	2.2	1.4	0.6	-0.2				
	23,100	3.2	3.2	3.2	3.2	3.2	3.0	2.1	1.3	0.5	-0.3				
6000	15,000	11.7	11.7	11.7	11.7	11.6	9.6	8.4	7.2	6.0	4.8				
	16,000	10.4	10.3	10.3	10.3	10.3	8.3	7.2	6.1	5.0	3.9				
	17,000	9.1	9.1	9.1	9.1	9.0	7.2	6.2	5.1	4.1	3.0				
	18,000	8.0	8.0	7.9	7.9	7.9	6.2	5.2	4.2	3.2	2.2				
	19,000	6.8	6.8	6.8	6.8	6.7	5.1	4.2	3.3	2.3	1.4				
	20,000	5.8	5.8	5.8	5.7	5.7	4.2	3.3	2.4	1.5	0.7				
	21,000	4.8	4.8	4.8	4.8	4.8	3.3	2.5	1.6	0.8	0.0				
	22,000	4.0	4.0	4.0	4.0	3.9	2.5	1.7	0.9	0.2	-0.6				
	22,750	3.4	3.4	3.4	3.4	3.3	2.0	1.2	0.5	-0.3					
	23,000	3.2	3.2	3.2	3.2	3.2	1.8	1.1	0.3	-0.4					
	23,100	3.1	3.1	3.1	3.1	3.1	1.8	1.0	0.3	-0.5					
8000	15,000	11.9	11.8	11.8	11.8	10.4	7.9	6.7	5.4	4.2	3.0				
	16,000	10.5	10.4	10.4	10 4	9.1	6.8	5.6	4.5	3.3	2.2				
	17,000	9.2	9.2	9.2	9.2	7.9	5.7	4.7	3.6	2.5	1.5				
	18,000	8.1	8.0	8 0	8.0	6.8	4.8	3.8	2.8	1.8	0.8				
	19,000	6.9	6.9	6.8	6.8	5.7	3.8	2.9	1.9	1.0	0.0				
	20,000	5.8	5.8	5.8	5.8	4.8	2.9	2.0	1.1	0.2	-0.7				
	21,000	4.9	4.9	4.9	4.8	3.9	2.1	1.3	0.4	-0.4					
	22,000	4.0	4.0	4.0	4.0	3.1	1.4	0.6	-0.2	-1.0					
	22,750	3.4	3.4	3.4	3.4	2.5	0.9	0.1	-0.6						
	23,000	3.2	3.2	3.2	3.2	2.3	0.8	0.0	-0.8						
	23,100	3.2	3.2	3.2	3.2	2.3	0.7	-0.1							
10000	15,000	12.0	12.0	12.0	10.8	8.4	6.2	5.0	3.9	2.8					
	16,000	10.6	10.6	10.6	9.5	7.3	5.1	4.1	3.0	2.0					
	17,000	9.3	9.3	9.3	8.3	6.2	4.2	3.2	2.2	1.3					
	18,000	8.2	8.1	8.1	7.2	5.2	3.3	2.4	1.5	0.5					
	19,000	7.0	7.0	6.9	6.0	4.2	2.4	1.6	0.7	-0.2					
	20,000	5.9	5.9	5.9	5.0	3.3	1.6	0.8	0.0	-0.9					
	21,000	5.0	5.0	4.9	4.1	2.5	0.9	0.1	-0.7						
	22,000	4.1	4.1	4.1	3.3	1.8	0.2	-0.5	-1.2						
	22,750	3.5	3.5	3.5	2.8	1.2	-0.2	-0.9							
	23,000	3.3	3.3	3.3	2.6	1.1	-0.3								
	23,100	3.3	3.2	3.2	2.5	1.0	-0.4								
12000	15,000	11.6	11.1	10.3	8.8	6.7	4.6	3.5	2.5						
	16,000	10.3	9.8	9.0	7.6	5.6	3.7	2.7	1.7						
	17,000	9.0	8.6	7.9	6.5	4.7	2.8	1.9	1.0						
	18,000	7.8	7.4	6.7	5.5	3.7	2.0	1.1	0.3						
	19,000	6.6	6.3	5.6	4.4	2.8	1.2	0.3	-0.6						
	20,000	5.6	5.3	4.7	3.5	2.0	0.4	-0.3							
	21,000	4.7	4.4	3.8	2.7	1.2	-0.2	-1.0							
	22,000	3.9	3.6	3.0	2.0	0.6	-0.8								
	22,750	3.3	3.0	2.5	1.5	0.1	-1.2								
	23,000	3.1	2.8	2.3	1.3	0.0	-1.4								
	23,100	3.0	2.8	2.2	1.2	-0.1									
14000	15,000	9.9	9.1	8.3	6.9	5.0	3.0	2.1	1.1						
	16,000	8.6	7.9	7.2	5.9	4.0	2.2	1.3	0.4						
	17,000	7.5	6.8	6.1	4.9	3.2	1.5	0.6	-0.2						
	18,000	6.3	5.6	5.0	3.8	2.2	0.6	-0.2							
	19,000	5.2	4.6	4.0	2.9	1.4	-0.1	-0.9							
	20,000	4.3	3.7	3.2	2.1	0.7	-0.8								
	21,000	3.5	2.9	2.4	1.4	0.0	-1.4								
	22,000	2.7	2.2	1.7	0.7	-0.8									
	22,750	2.2	1.7	1.2	0.2	-1.0									
	23,000	2.0	1.5	1.0	0.1	-1.2									
	23,100	1.9	1.4	1.0	0.0	-1.2									

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... DOWN
- Flaps ..... 20°
- Speed ..... V_{LOF}

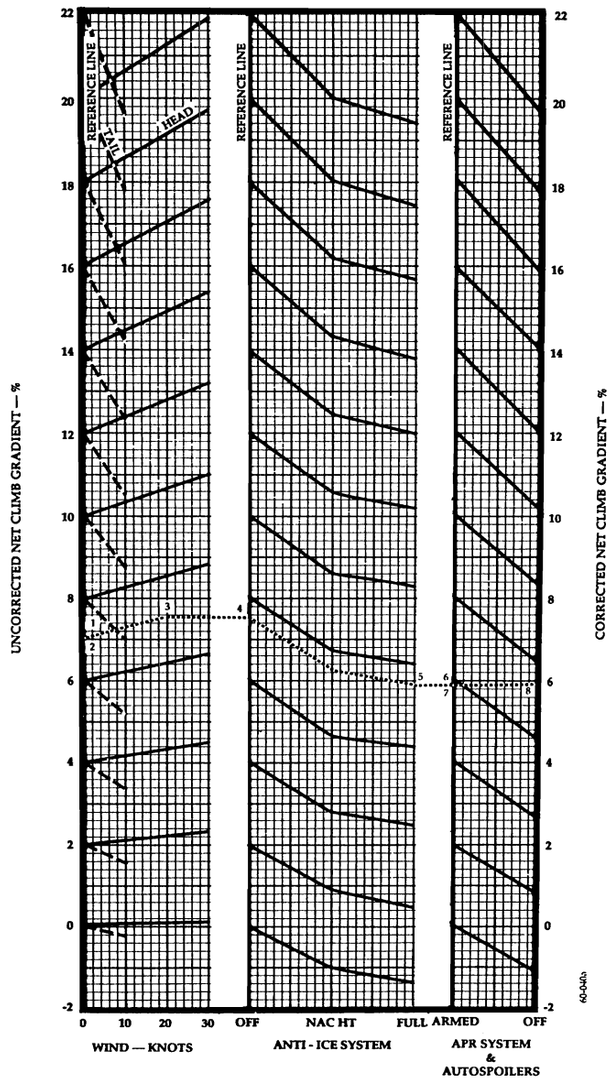


Figure 5-60.1

UNCORRECTED SECOND SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	14.7	14.7	14.7	14.7	14.6	14.5	14.4	13.9	13.0	11.7	10.4	9.1		
	16,000	13.2	13.1	13.1	13.1	13.0	12.9	12.8	12.4	11.6	10.3	9.1	7.9		
	17,000	11.7	11.7	11.7	11.7	11.6	11 5	11.4	11.0	10.2	9.1	7.9	6.8		
	18,000	10.4	10.4	10.4	10.4	10.3	10.2	10.1	9.8	9.0	7.9	6.8	5.8		
	19,000	9.2	9.2	9.2	9.1	9.1	9.0	8.9	8.6	7.9	6.8	5.8	4.8		
	20,000	8.1	8.1	8.1	8 0	8.0	7.9	7 8	7.5	6.8	5.9	4.9	3.9		
	21,000	7.1	7.1	7.1	7.1	7.0	6.9	6.9	6.5	5.9	5.0	4.1	3.2		
	22,000	6.2	6.2	6.2	6.2	6.1	6.0	6.0	5.7	5.1	4.2	3.3	2.5		
	22,750	5.6	5.6	5.5	5.5	5.5	5.4	5.4	5.1	4.5	3.7	2.8	2.0		
	23,000	5.4	5.4	5.4	5.3	5.3	5.2	5.2	4.9	4.3	3.5	2.6	1.8		
	23,500	5.0	5.0	5.0	5.0	4.9	4.8	4.8	4.5	4.0	3.1	2.3	1.5		
2000	15,000	14.7	14.6	14.6	14.6	14.5	14.3	13.6	12.5	11.2	9.9	8.7	7.4		
	16,000	13.1	13.1	13.0	13.0	12.9	12.8	12.1	11.0	9.8	8.7	7.5	6.3		
	17,000	11.7	11.6	11.6	11.6	11.5	11.4	10.7	9.7	8.6	7.5	6.4	5.3		
	18,000	10.4	10.3	10.3	10.3	10.2	10.1	9.5	8.5	7.5	6.5	5.4	4.4		
	19,000	9.1	9.1	9.1	9.1	9.0	8.9	8.3	7.4	6.4	5.5	4.5	3.5		
	20,000	8 0	8.0	8.0	8.0	7.9	7.8	7.3	6.4	5.5	4.6	3.6	2.7		
	21,000	7.0	7.0	7.0	7.0	6 9	6.8	6.3	5.5	4.6	3.7	2.9	2.0		
	22,000	6.1	6.1	6.1	6.1	6.0	5.9	5.4	4.7	3.8	3.0	2.2	1.4		
	22,750	5.5	5.5	5.5	5.5	5.4	5.3	4.8	4.1	3 3	2 5	1.7	0.9		
	23,000	5.3	5.3	5.3	5.3	5.2	5.1	4.7	3.9	3.1	2.4	1.6	0.8		
	23,500	4.9	4.9	4.9	4.9	4.8	4.7	4.3	3.6	2.8	2.0	1.3	0.5		
4000	15,000	14.5	14.5	14.5	14.5	14.4	13.2	11.9	10.6	9.4	8.1	6.9			
	16,000	13.0	12.9	12.9	12.9	12.8	11.7	10.5	9.3	8.1	7.0	5.9			
	17,000	11.5	11.5	11.5	11.5	11.4	10.4	9.3	8.1	7.0	6.0	4.9			
	18,000	10.2	10.2	10.2	10.2	10.1	9.2	8.1	7.0	6.0	5.0	4.0			
	19,000	9.0	9.0	9.0	9.0	8.9	8.0	7.0	6.0	5.0	4.1	3.1			
	20,000	7.9	7.9	7.9	7.9	7.8	7.0	6.0	5.1	4.2	3.3	2.4			
	21,000	6.9	6.9	6.9	6.9	6.8	6.0	5.1	4.2	3.4	2.5	1.7			
	22,000	6.0	6.0	6.0	6.0	6.0	5.2	4.3	3.5	2.6	1.8	1.0			
	22,750	5.4	5.4	5.4	5.4	5.3	4.6	3.8	2.9	2.2	1.4	0.8			
	23,000	5.2	5.2	5.2	5.2	5.2	4.4	3.6	2.8	2.0	1.2	0.5			
	23,500	4.9	4.8	4.8	4.8	4.8	4.1	3.2	2.4	1.7	0.9	0.2			
6000	15,000	14.4	14.4	14.4	14.4	13.6	11.2	10.0	8.9	7.7	6.5				
	16,000	12.9	12.8	12.8	12.8	12.1	9.9	8.8	7.7	6.6	5.5				
	17,000	11.5	11.4	11.4	11.4	10.7	8.6	7.6	6.6	5.6	4.6				
	18,000	10.2	10.2	10.1	10.1	9.5	7.5	6.6	5.6	4.6	3.7				
	19,000	8.9	8.9	8.9	8.9	8.3	6.5	5.6	4.6	3.7	2.8				
	20,000	7.9	7.8	7.8	7.8	7.3	5.5	4.6	3.8	2.9	2.1				
	21,000	6.9	6.9	6.8	6.8	6.3	4.6	3.8	3.0	2.2	1.4				
	22,000	6.0	6.0	6.0	5.9	5.4	3.9	3.1	2.3	1.6	0.8				
	22,750	5.4	5.4	5.3	5.3	4.9	3.3	2.6	1 8	1.1	0.4				
	23,000	5.2	5.2	5.1	5.1	4.7	3.2	2.4	1.7	1.0	0.2				
	23,500	4.8	4.8	4.8	4.8	4.3	2.8	2.1	1.4	0.7	0.0				
8000	15,000	14.5	14.5	14.4	13.8	11.9	9.4	8.3	7.2	6.1	5.0				
	16,000	12.9	12.9	12.9	12.3	10.5	8.2	7.2	6.1	5.1	4.1				
	17,000	11.5	11.5	11.5	10.9	9.3	7.1	6.1	5.1	4.2	3.2				
	18,000	10.2	10.2	10.2	9.7	8.1	6.1	5.2	4.2	3.3	2.4				
	19,000	9.0	9.0	8.9	8.5	7.0	5.1	4.2	3.4	2.5	1.6				
	20,000	7.9	7.9	7.8	7.4	6.0	4.2	3.4	2.6	1.8	1.0				
	21,000	6.9	6.9	6.9	6.4	5.1	3.4	2.6	1 9	1.1	0.3				
	22,000	6.0	6.0	6.0	5.6	4.3	2.7	2.0	1.2	0.5	-0.2				
	22,750	5.4	5.4	5.3	5.0	3.8	2.2	1.5	0.8	0.1	-0.8				
	23,000	5.2	5.2	5.2	4.8	3.6	2.1	1.4	0.7	0.0	-0.7				
	23,500	4.8	4.8	4.8	4.4	3.2	1.7	1.1	0.4	-0.3					
10000	15,000	14.3	13.8	13.3	12.2	9.9	7.8	6.7	5.6	4.6					
	16,000	12.8	12.3	11.8	10.8	8.7	6.6	5.6	4.7	3.7					
	17,000	11.4	10.9	10.5	9.6	7.5	5.6	4.7	3.8	2.8					
	18,000	10.1	9.7	9.2	8.4	6.5	4.7	3.8	2.9	2.1					
	19,000	8.8	8.5	8.1	7.2	5.5	3.8	2.9	2.1	1.3					
	20,000	7.7	7.4	7.0	6.2	4.6	3.0	2.2	1.4	0.6					
	21,000	6.8	6.4	6.1	5.3	3.7	2.2	1.5	0.8	0.0					
	22,000	5.9	5.6	5.2	4.5	3.0	1.6	0.9	0.2	-0.5					
	22,750	5.3	5.0	4.6	4.0	2.5	1.1	0.5	-0.2						
	23,000	5.1	4.8	4.4	3.8	2.3	1.0	0.3	-0.3						
	23,500	4.7	4.4	4.1	3.4	2.0	0.7	0.1	-0.6						
12000	15,000	13.1	12.3	11.3	10.2	8.1	6.1	5.1	4.2						
	16,000	11.7	10.8	10.0	8.9	7.0	5.1	4.2	3.3						
	17,000	10.3	9.6	8.8	7.7	6.0	4.2	3.3	2.5						
	18,000	9.1	8.4	7.6	6.6	5.0	3.3	2.5	1.7						
	19,000	7.9	7.2	6.5	5.6	4.0	2.5	1.7	1.0						
	20,000	6.9	6.3	5 6	4.7	3.2	1.7	1.0	0.3						
	21,000	6.0	5.4	4.7	3.9	2.5	1.1	0.4	-0.3						
	22,000	5.2	4.6	3.9	3.2	1.8	0.5	-0.1							
	22,750	4.6	4.0	3.4	2.7	1.4	0.1	-0.5							
	23,000	4.4	3.8	3.2	2.5	1.2	0.0	-0.7							
	23,500	4.0	3.5	2.9	2.2	0.9	-0.3								
14000	15,000	11.3	10.5	9.7	8.2	6.5	4.7	3.7	2.8						
	16,000	10.0	9.2	8.5	7.0	5.4	3.7	2.9	2.0						
	17,000	8.7	8.0	7.4	6.0	4.5	2.9	2.1	1.3						
	18,000	7.6	6.9	6.3	5.0	3.6	2.1	1.3	0.6						
	19,000	6.5	5.9	5.3	4.1	2.7	1.3	0.6	-0.1						
	20,000	5.6	5.0	4.4	3.3	2.0	0.7	0.0	-0.7						
	21,000	4.8	4.2	3.6	2.5	1.3	0.1	-0.6							
	22,000	4.0	3.5	2.9	1.9	0.7	-0.5								
	22,750	3.5	3.0	2.4	1.4	0.3	-0.8								
	23,000	3.3	2.8	2.3	1.3	0.2	-1.0								
	23,500	3.0	2.5	2.0	1.0	-0.1									

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

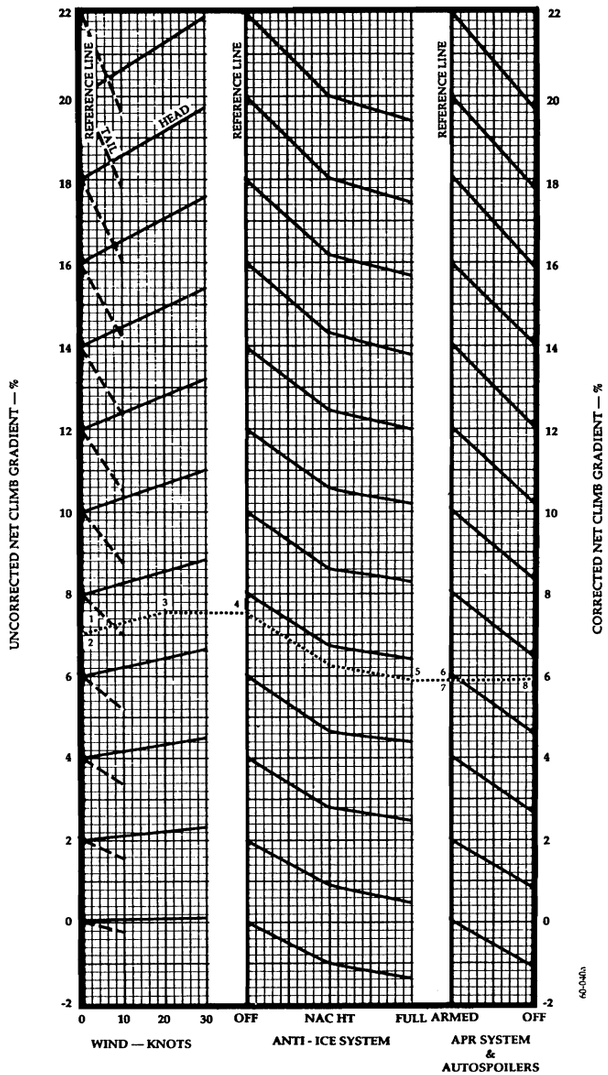
Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... UP
- Flaps ..... 20°
- Speed V2

SECOND SEGMENT CLIMB GRADIENT
FLAPS — 20°

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1



UNCORRECTED SECOND SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	50	60	70	80	90	100	110	120	
SEA LEVEL	15,000	14.3	14.2	14.2	14.2	14.1	14.0	13.9	13.4	12.6	11.3	10.0	8.7		
	16,000	12.7	12.7	12.7	12.6	12.5	12.4	12.4	11.9	11.1	9.9	8.7	7.5		
	17,000	11.3	11.3	11.3	11.2	11.1	11.0	11.0	10.6	9 8	8.7	7.6	6.4		
	18,000	10.0	10.0	10.0	10.0	9.9	9.8	9.7	9.4	8.7	7.6	6.5	5.5		
	19,000	8.8	8.8	8.8	8.8	8.7	8.6	8.6	8.2	7.5	6.5	5.5	4.5		
	20,000	7.7	7.7	7.7	7.7	7.6	7.5	7.5	7.1	6 5	5.6	4.6	3.7		
	21,000	6.8	6.7	6.7	6.7	6.6	6.6	6 5	6.2	5.6	4.7	3.8	2.9		
	22,000	5.9	5.9	5.9	5.8	5.8	5.7	5.7	5.3	4.8	3.9	3.1	2.2		
	22,750	5.3	5.3	5.3	5.2	5.2	5.1	5.1	4.8	4.2	3.4	2.6	1.8		
	23,000	5.1	5.1	5.1	5.1	5.0	4.9	4.9	4.6	4.0	3.2	2.4	1.6		
	23,100	5.0	5.0	5.0	5.0	4.9	4.8	4.8	4.5	3.9	3.1	2.3	1.5		
2000	15,000	14.2	14.2	14.2	14.1	14.0	13.8	13.1	12.0	10.7	9.5	8.2	7.0		
	16,000	12.6	12.6	12.6	12.6	12.5	12.3	11.6	10.6	9.4	8.3	7.1	5.9		
	17,000	11.2	11.2	11.2	11.2	11.1	10.9	10.3	9.3	8.2	7.1	6.0	4.9		
	18,000	10.0	9.9	9.9	9.9	9.8	9.7	9.1	8.2	7.1	6.1	5.1	4.0		
	19,000	8.8	8.8	8.7	8.7	8.7	8.5	7.9	7.1	6.1	5.1	4.2	3.2		
	20,000	7.7	7.7	7.7	7.7	7.6	7.4	6.9	6.1	5.2	4.2	3.3	2.4		
	21,000	6.7	6.7	6.7	6.7	6.6	6.5	6.0	5.2	4.3	3.5	2.6	1.7		
	22,000	5.8	5.8	5.8	5.8	5.8	5.6	5.1	4.4	3.6	2.7	1.9	1.1		
	22,750	5.2	5.2	5.2	5.2	5.1	5.0	4.6	3.8	3.0	2.2	1.4	0.6		
	23,000	5.0	5.0	5.0	5.0	5.0	4.8	4.4	3.7	2.9	2.1	1.3	0.5		
	23,100	5.0	5.0	4.9	4.9	4.9	4.7	4.3	3.6	2.8	2.0	1.2	0.5		
4000	15,000	14.1	14.1	14.0	14.0	13.9	12.7	11.5	10.2	9.0	7.7	6.5			
	16,000	12.5	12.5	12.5	12.5	12.4	11.3	10.1	8.9	7.8	6.6	5.5			
	17,000	11.1	11.1	11.1	11.1	11.0	10.0	8.9	7.8	6.7	5.6	4.5			
	18,000	9.9	9 9	9.8	9.8	9.8	8.8	7.7	6.7	5.7	4.7	3.7			
	19,000	8.7	8.7	8.7	8.6	8.6	7.6	6.7	5.7	4.7	3.8	2.8			
	20,000	7.6	7.6	7.6	7.6	7.5	6.6	5.7	4.8	3.9	3.0	2.1			
	21,000	6.7	6.6	6.6	6.6	6.6	5.7	4.8	4.0	3.1	2.2	1.4			
	22,000	5.8	5.8	5.8	5.7	5.7	4.9	4.0	3.2	2.4	1.6	0.8			
	22,750	5.2	5.2	5.2	5.1	5.1	4.3	3.5	2.7	1.9	1.1	0.3			
	23,000	5.0	5.0	5.0	5.0	4.9	4.1	3.3	2.5	1.8	1.0	0.2			
	23,100	4.9	4.9	4.9	4.9	4.8	4.1	3.3	2.5	1.7	0.9	0.2			
6000	15,000	14.0	14.0	14.0	14.0	13.2	10.9	9.7	8.5	7.3	6.1				
	16,000	12.5	12.5	12.5	12.4	11.7	9.6	8.4	7.3	6.2	5.1				
	17,000	11.1	11.1	11.1	11.1	10.4	8.4	7.3	6.3	5.2	4.1				
	18,000	9.8	9.8	9.8	9.8	9.2	7.3	6.3	5.3	4.3	3.3				
	19,000	8.7	8.6	8.6	8.6	8.0	6.2	5.3	4.3	3.4	2.5				
	20,000	7.6	7.6	7.6	7.5	7.0	5.3	4.4	3.5	2.6	1.7				
	21,000	6.6	6.6	6.6	6.6	6.1	4.5	3.6	2.8	1.9	1.1				
	22,000	5.8	5.7	5.7	5.7	5 2	3.7	2.9	2.1	1.3	0.5				
	22,750	5.2	5.1	5.1	5.1	4.6	3.2	2.4	1.6	0.8	0.1				
	23,000	5.0	4.9	4.9	4.9	4.5	3.0	2.2	1.5	0.7	-0.1				
	23,100	4.9	4.9	4.9	4.9	4.4	2.9	2.2	1.4	0.6	-0.1				
8000	15,000	14.2	14.1	14.1	13.5	11.6	9.2	8.0	6.8	5.6	4.5				
	16,000	12.6	12.6	12.6	12.0	10.2	8.0	6.9	5.8	4.7	3.6				
	17,000	11.2	11.2	11.2	10.7	9.0	6.9	5.8	4.8	3.8	2.7				
	18,000	10.0	9.9	9.9	9.4	7.8	5.9	4.9	3.9	2.9	2.0				
	19,000	8.7	8.7	8.7	8.2	6.8	4.9	4.0	3.1	2.1	1.2				
	20,000	7.7	7.7	7.6	7.2	5.8	4.0	3.2	2.3	1.4	0.5				
	21,000	6.7	6.7	6.7	6.3	4.9	3.3	2.4	1.6	0.8	0.0				
	22,000	5.8	5.8	5.8	5.4	4.1	2.6	1.8	1.0	0.2	-0.6				
	22,750	5.2	5.2	5.2	4.8	3.6	2.1	1.3	0.6	-0.2					
	23,000	5.0	5.0	5.0	4.6	3.4	1.9	1.2	0.4	-0.3					
	23,100	4.9	4.9	4.9	4.6	3.3	1.8	1.1	0.4	-0.4					
10000	15,000	14.0	13.8	13.3	12.0	9.7	7.5	6.4	5.3	4.2					
	16,000	12.5	12.3	11.9	10.6	8.5	6.4	5.4	4.4	3.3					
	17,000	11.1	10.9	10.5	9.3	7.3	5.4	4.4	3.5	2.5					
	18,000	9.8	9.6	9.3	8.2	6.3	4.5	3.6	2.7	1.8					
	19,000	8.6	8.4	8.1	7.1	5.3	3.6	2.7	1.9	1.0					
	20,000	7.6	7.4	7.1	6.1	4.4	2.8	2.0	1.2	0.4					
	21,000	6.6	6.4	6.1	5.2	3.6	2.1	1.3	0.6	-0.2					
	22,000	5.7	5.6	5.3	4.4	2.9	1.4	0.7	0.0	-0.7					
	22,750	5.1	5.0	4.7	3.8	2.4	1.0	0.3	-0.4						
	23,000	5.0	4.8	4.5	3.7	2.2	0.9	0.2	-0.5						
	23,100	4.9	4.7	4.5	3.6	2.2	0.8	0.1	-0.6						
12000	15,000	12.9	12.3	11.5	10.0	8.0	5.9	4.9	3.8						
	16,000	11.5	10.9	10.1	8.8	6.8	4.9	4.0	3.0						
	17,000	10.2	9.6	8.9	7.6	5.8	4.0	3.1	2.2						
	18,000	8.9	8.4	7.7	6.5	4.8	3.1	2.3	1.5						
	19,000	7.8	7.3	6.7	5.5	3.9	2.3	1.6	0.8						
	20,000	6.8	6.3	5.7	4.6	3.1	1.6	0.9	0.1						
	21,000	5.9	5.5	4.9	3.8	2.4	1.0	0.3	-0.4						
	22,000	5.1	4.7	4.1	3.1	1.7	0.4	-0.3							
	22,750	4.5	4.1	3.6	2.6	1.3	0.0	-0.7							
	23,000	4.3	3.9	3.4	2.4	1.1	-0.1								
	23,100	4.2	3.9	3.4	2.4	1.1	-0.2								
14000	15,000	11.2	10.2	9.5	8.2	6.3	4.4	3.4	2.5						
	16,000	9.9	9.0	8.2	7.0	5.2	3.5	2.6	1.7						
	17,000	8.7	7.8	7.1	6.0	4.3	2.7	1.8	1.0						
	18,000	7.5	6.7	6.1	5.0	3.4	1.8	1.1	0.3						
	19,000	6.5	5.7	5.1	4.1	2.6	1.1	0.4	-0.3						
	20,000	5.6	4.8	4.3	3.2	1.9	0.5	-0.2							
	21,000	4.7	4.0	3.5	2.5	1.2	-0.1	-0.8							
	22,000	4.0	3.3	2.8	1.9	0.6	-0.6								
	22,750	3.5	2.8	2.3	1.4	0.2	-1.0								
	23,000	3.3	2.7	2.2	1.3	0.1	-1.1								
	23,100	3.2	2.6	2.1	1.2	0.0	-1.2								

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 7%
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Anti-Ice Systems ..... FULL
6. Reference Line
7. APR & Autospoilers System ..... ARMED
8. Corrected Net Climb Gradient 5.9%

Conditions:

- Single Engine
- Thrust ..... Takeoff
- Gear ..... UP
- Flaps ..... 20°
- Speed V2

SECOND SEGMENT CLIMB GRADIENT
FLAPS — 20°

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

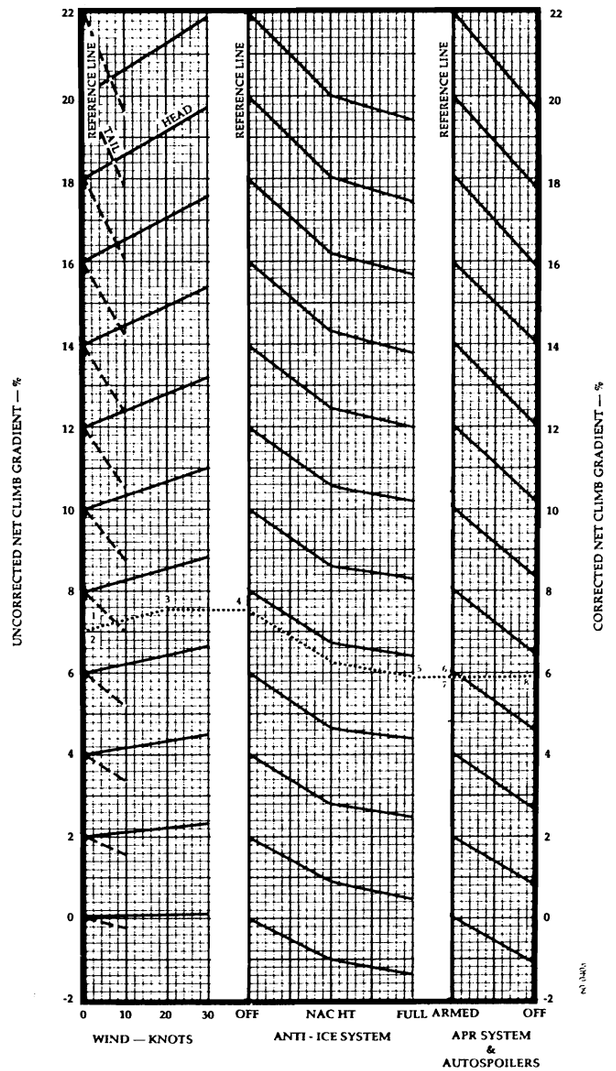


Figure 5-61.1

UNCORRECTED FINAL SEGMENT NET CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	16.6	16.5	16.5	16.5	16 0	15 0	13 9	12 6	11.4	10.1	8.9	7 7		
	16,000	14.8	14.7	14.7	14.7	14 2	13.3	12.3	11.1	10.0	8.8	7.7	6 6		
	17,000	13.2	13.2	13.2	13 2	12.7	11.9	10 9	9.8	8 7	7.7	6.6	5 6		
	18,000	11.9	11.8	11.8	11 8	11.4	10.6	9 7	8 6	7.6	6.7	5.7	4 7		
	19,000	10.7	10.6	10.6	10.6	10.2	9.5	8 6	7 6	6.7	5.8	4.8	3 9		
	20,000	9.6	9.6	9.5	9.5	9 1	8.4	7 6	6.7	5.8	5.0	4.1	3 2		
	21,000	8.6	8.6	8.6	8 6	8.2	7.5	6.8	5.9	5.1	4 2	3 4	2 6		
	22,000	7.7	7.7	7.7	7 7	7 3	6.7	6.0	5.1	4 4	3 6	2.8	2.0		
	22,750	7.1	7.1	7.1	7 1	6.7	6.1	5 4	4.6	3.9	3.1	2.4	1 6		
	23,000	6.9	6.9	6.9	6.9	6 5	6.0	5 3	4.5	3.7	3.0	2.2	1 5		
	23,500	6.6	6.5	6.5	6.5	6.2	5.6	4.9	4.1	3.4	2.7	2.0	1.2		
2000	15,000	16.5	16.4	16.4	16 4	15 3	13.3	12.1	10.9	9 8	8.6	7.4	6.3		
	16,000	14.7	14.7	14.6	14 6	13.6	11.7	10.7	9.5	8 5	7 4	6.3	5.2		
	17,000	13.1	13.1	13.1	13.1	12.1	10.4	9 4	8.3	7 3	6.3	5.3	4.2		
	18,000	11.8	11.8	11.8	11.7	10.8	9.2	8 3	7.3	6.3	5.4	4.5	3.5		
	19,000	10.6	10.6	10.6	10.5	9.7	8.1	7.3	6.3	5.5	4.6	3.7	2.8		
	20,000	9.5	9.5	9.5	9 5	8 7	7.2	6.4	5.5	4 7	3.8	3.0	2.2		
	21,000	8.6	8.5	8.5	8 5	7 7	6.3	5.6	4.7	4 0	3.2	2.4	1.6		
	22,000	7.7	7.7	7.6	7.6	6 9	5.6	4 8	4.1	3.3	2.6	1.8	1.1		
	22,750	7.1	7.1	7.0	7 0	6 3	5.0	4.3	3.6	2 9	2.1	1.4	0.7		
	23,000	6.9	6.9	6 9	6.8	6.1	4.9	4.2	3.4	2 7	2.0	1.3	0.6		
	23,500	6.5	6.5	6 5	6.5	5.8	4.6	3.9	3.2	2.5	1.8	1.1	0.4		
4000	15,000	16.4	16.4	16.2	16.0	14 3	11.6	10 4	9.3	8.2	7.1	6.0			
	16,000	14.6	14.6	14 5	14 2	12 7	10.1	9.1	8.1	7 0	6.0	5.0			
	17,000	13 1	13.1	12 9	12.7	11 3	8.9	7.9	6.9	6 0	5.0	4.1			
	18,000	11 7	11.7	11.6	11.4	10 0	7.8	6.9	6.0	5 1	4.2	3.3			
	19,000	10.6	10.5	10 4	10.2	8.9	6 8	6 0	5 1	4.3	3.4	2.6			
	20,000	9.5	9.5	9.4	9.1	8.0	6.0	5 2	4 3	3.5	2.7	2.0			
	21,000	8.5	8.5	8.4	8.2	7.1	5.2	4 4	3 7	2.9	2.1	1.4			
	22,000	7.6	7.6	7.5	7.3	6.3	4.5	3.7	3 0	2.3	1.6	0.9			
	22,750	7.0	7.0	6.9	6.8	5.7	4.0	3.3	2 6	1.9	1.2	0.5			
	23,000	6.9	6.8	6.7	6.6	5.5	3.8	3.1	2.5	1.8	1.1	0.4			
	23,500	6.5	6.5	6.4	6.2	5 2	3.5	2.9	2.2	1.5	0.9	0.2			
6000	15,000	16.4	16.4	15 8	14.5	12.5	10.0	8 9	7.8	6.7	5.6				
	16,000	14.7	14.6	14 0	12.8	11 0	8.7	7.7	6.6	5 6	4.6				
	17,000	13.1	13.1	12.5	11.4	9 7	7.5	6.6	5.6	4.7	3.8				
	18,000	11.8	11.7	11.2	10.2	8 5	6.5	5.6	4.7	3.9	3.0				
	19,000	10.6	10.5	10.0	9.1	7.5	5.6	4.8	4.0	3.1	2.3				
	20,000	9.5	9.4	9 0	8.1	6.6	4.8	4.0	3.3	2.5	1.7				
	21,000	8.5	8.5	8 0	7.2	5.8	4.1	3 4	2.6	1.9	1.1				
	22,000	7.6	7.6	7.2	6.4	5 0	3.4	2.7	2.0	1 3	0.6				
	22,750	7.0	7.0	6.6	5.8	4.5	3.0	2.3	1 6	1 0	0.3				
	23,000	6.9	6.8	6.4	5.6	4.4	2.8	2.2	1.5	0.9	0.2				
	23,500	6.5	6.5	6.1	5.3	4.1	2.6	1.9	1.3	0.6	0.0				
8000	15,000	16.4	16.3	15.3	13.0	10.6	8.4	7.4	6.3	5 3	4.2				
	16,000	14.7	14.6	13.6	11.5	9 2	7.2	6.2	5.3	4.3	3.3				
	17,000	13.1	13.0	12.1	10.1	8.1	6.2	5 3	4.3	3.4	2.5				
	18,000	11.8	11.7	10.8	9 0	7.0	5.2	4.4	3 5	2.7	1.9				
	19,000	10.5	10.5	9.6	7.9	6.1	4.4	3 6	2.8	2.0	1.2				
	20,000	9.5	9.4	8.6	7.0	5.3	3.7	2 9	2.2	1.4	0.7				
	21,000	8.5	8.5	7.7	6.2	4.5	3.0	2.3	1.6	0.9	0.2				
	22,000	7.6	7.6	6.9	5.4	3.8	2.4	1 7	1 1	0.4	-0.3				
	22,750	7.0	7.0	6.3	4.9	3 4	2.0	1.4	0.7	0.1	-0.8				
	23,000	6.8	6.8	6.1	4.7	3.2	1.9	1.2	0 6	-0.1					
	23,500	6.5	6.4	5.8	4.4	2.9	1.6	1.0	0.4	-0.3					
10000	15,000	15.4	15.0	13.6	11.3	9 0	7.0	6.0	5.0	4.1					
	16,000	13.7	13.4	12.0	9.9	7.8	5.9	5.0	4.1	3.2					
	17,000	12.2	11.9	10.7	8.6	6.7	5.0	4.1	3.2	2.4					
	18,000	10.9	10.6	9.5	7.6	5.7	4.1	3.3	2.5	1.7					
	19,000	9.8	9.5	8.4	6.6	4.9	3.4	2 6	1.8	1.1					
	20,000	8.8	8.5	7.4	5.8	4.1	2.7	2.0	1.3	0.6					
	21,000	7.9	7.6	6.6	5 0	3.4	2.1	1 4	0 7	0.0					
	22,000	7.0	6.8	5.8	4 3	2.8	1.5	0 9	0.2	-0.4					
	22,750	6 4	6.2	5.3	3.8	2.4	1.2	0 5	-0.1						
	23,000	6.3	6.0	5 1	3.7	2.3	1.0	0.4	-0.2						
	23,500	5.9	5.7	4.8	3.4	2.0	0.8	0.2	-0.4						
12000	15,000	14.1	13.3	11.6	9.5	7.6	5.7	4.8	3.8						
	16,000	12.5	11.8	10.2	8.2	6 4	4.7	3.8	3.0						
	17,000	11.1	10.4	8 9	7.1	5.4	3.8	3.0	2.2						
	18,000	9.9	9.3	7 9	6.2	4.5	3.0	2.3	1.5						
	19,000	8.8	8.2	6.9	5.3	3.8	2.3	1.6	0.9						
	20,000	7.9	7.3	6.0	4.5	3 1	1.7	1.1	0.4						
	21,000	7.0	6.4	5.2	3.8	2.5	1.2	0.6	-0.1						
	22,000	6.3	5.7	4.6	3.2	1 9	0.7	0.1	-0.5						
	22,750	5.7	5.2	4.1	2.8	1.5	0.4	-0.2							
	23,000	5.6	5.0	3.9	2.6	1.4	0.2	-0.3							
	23,500	5.2	4.7	3.6	2.4	1.2	0.0	-0.5							
14000	15,000	12.2	11.2	9.3	7.5	5.8	4.1	3 3	2.4						
	16,000	10.9	9.9	8.2	6.5	4.9	3.3	2.5	1.7						
	17,000	9.8	8.8	7.2	5.6	4.1	2.6	1 9	1.1						
	18,000	8.8	7.9	6.3	4.8	3.4	2.0	1 3	0.9						
	19,000	7.8	6.9	5.5	4.0	2.7	1.4	0 7	0.1						
	20,000	7 0	6.1	4.7	3.3	2.1	0.8	0 2	-0.4						
	21,000	6.2	5.3	4.0	2.7	1.5	0 3	-0.2							
	22,000	5.4	4.6	3.4	2.1	1.0	-0.1	-0.7							
	22,750	5.0	4.2	3.0	1.8	0.7	-0.4								
	23,000	4.8	4 0	2.8	1.6	0 6	-0.5								
	23,500	4.5	3.7	2.5	1.4	0.3	-0.8								

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table) 9%
2. Headwind ..... 20 Kts
3. Reference Line
4. Anti-Ice Systems ..... FULL
5. Corrected Net Climb Gradient 7.9%

Conditions:

- Single Engine
- Thrust ..... Max. Continuous
- Gear ..... UP
- Flaps ..... UP
- Speed ..... 1.25 V_{S1}

FINAL SEGMENT CLIMB GRADIENT

EFFECTIVITY
All

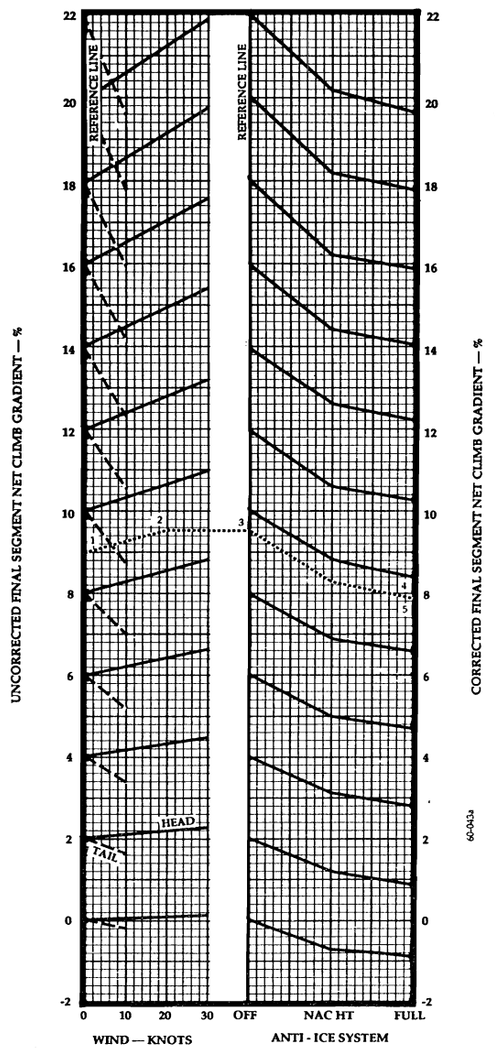


Figure 5-62

CLOSE-IN TAKEOFF FLIGHT PATH

EFFECTIVITY
All

EXAMPLE:

1. Obstacle Distance
   (Horizontal from Reference Zero)..... 6500 FT (1981 M)
2. Obstacle Height
   (Above runway surface) .....500 FT
3. Required Net Climb Gradient 8.0%

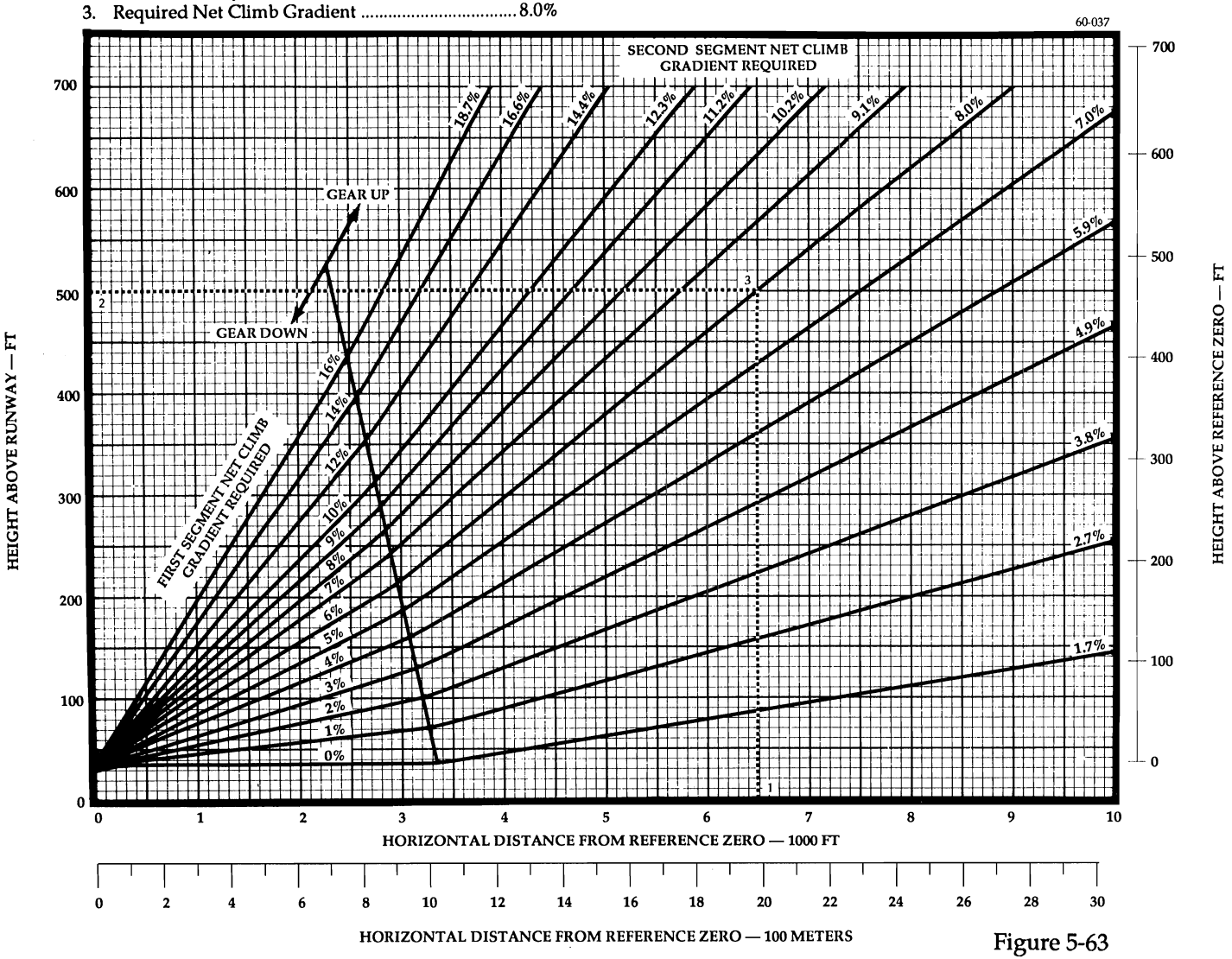


Figure 5-63

DISTANT TAKEOFF FLIGHT PATH

EFFECTIVITY
All

EXAMPLE:

1. Horizontal Distance
   (Horizontal from Reference Zero).... 16000 FT (4877 M)
2. Obstacle Height
   (Above runway surface).....950 FT
3. Required Net Climb Gradient 6%

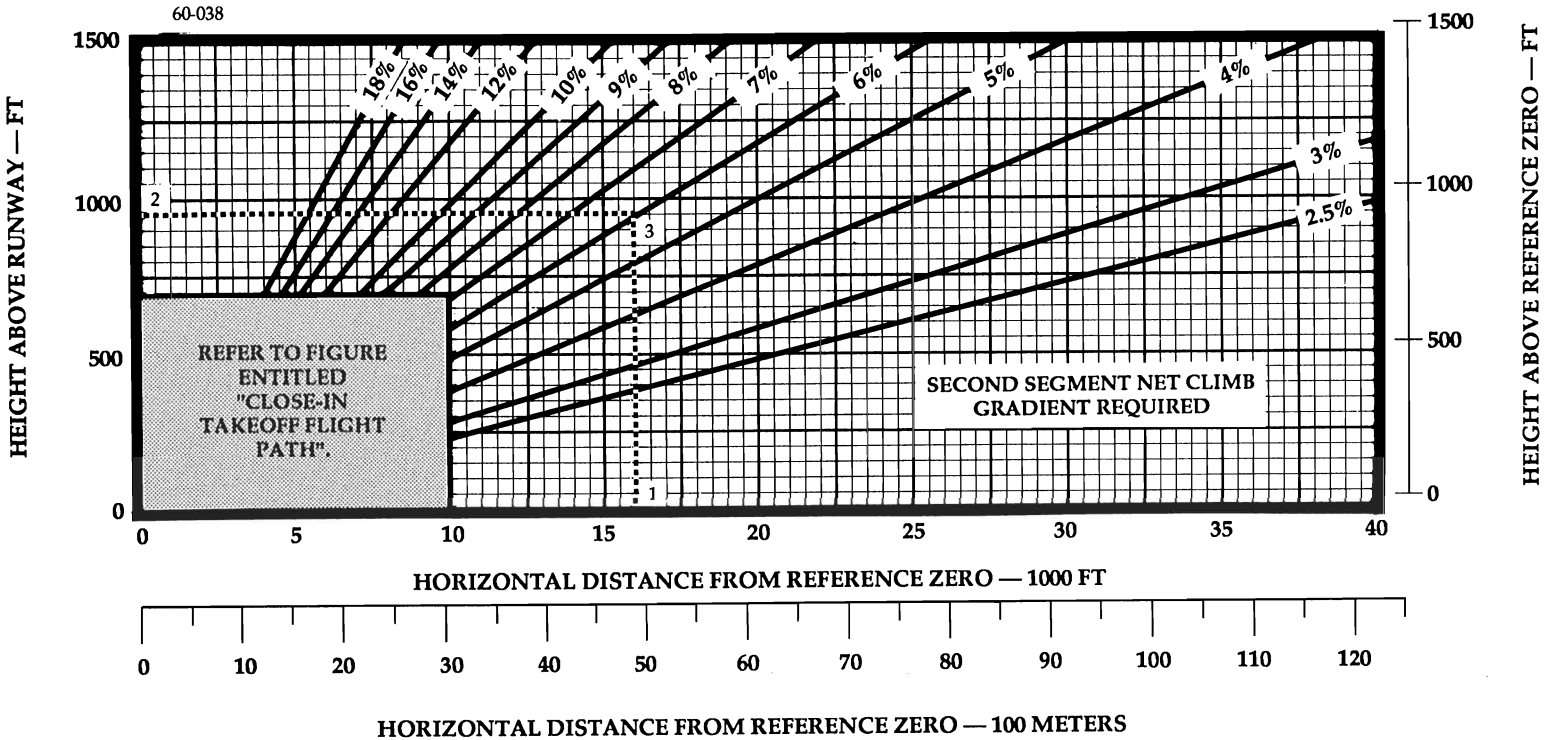


Figure 5-64

ENROUTE CLIMB GRADIENT
SINGLE ENGINE

EFFECTIVITY
All

UNCORRECTED ENROUTE SEGMENT NET CLIMB GRADIENT — %

ALT FT	WT LB	TEMPERATURE °C	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50
		°F	-80	-60	-40	-20	0	20	40	60	80	100	120	
SEA LEVEL	15,000			12.3	12.3	12.3	12.2	12.2	12.1	12.0	9.6	7.3	5.1	
	16,000			11.2	11.2	11.2	11.1	11.1	11.0	10.9	8.6	6.6	4.5	
	17,000			10.2	10.2	10.2	10.1	10.1	10.0	9.9	7.8	5.8	3.9	
	18,000			9.3	9.3	9.3	9.2	9.2	9.1	9.0	7.0	5.2	3.4	
	19,000			8.5	8.5	8.5	8.4	8.4	8.3	8.2	6.4	4.6	2.9	
	20,000			7.8	7.7	7.7	7.7	7.7	7.6	7.5	5.7	4.1	2.4	
	21,000			7.1	7.0	7.0	7.0	7.0	6.9	6.8	5.1	3.6	2.0	
	22,000			6.4	6.4	6.4	6.4	6.4	6.3	6.2	4.6	3.1	1.6	
	22,750			6.0	6.0	5.9	5.9	5.9	5.8	5.8	4.2	2.8	1.3	
	23,000			5.8	5.8	5.8	5.8	5.8	5.7	5.6	4.1	2.7	1.2	
	23,500			5.6	5.5	5.5	5.5	5.5	5.4	5.4	3.8	2.4	1.0	
5000	15,000			12.3	12.2	12.2	12.1	12.1	10.6	7.9	5.9	3.9		
	16,000			11.2	11.1	11.1	11.0	11.0	9.6	7.1	5.2	3.4		
	17,000			10.2	10.1	10.1	10.1	10.0	8.7	6.4	4.6	2.9		
	18,000			9.3	9.2	9.2	9.2	9.1	7.9	5.7	4.0	2.4		
	19,000			8.4	8.4	8.4	8.4	8.3	7.1	5.1	3.5	1.9		
	20,000			7.7	7.7	7.6	7.6	7.6	6.5	4.5	3.0	1.5		
	21,000			7.0	7.0	7.0	6.9	6.9	5.8	4.0	2.6	1.2		
	22,000			6.4	6.4	6.3	6.3	6.3	5.3	3.5	2.1	0.8		
	22,750			5.9	5.9	5.9	5.9	5.8	4.9	3.2	1.8	0.5		
	23,000			5.8	5.8	5.7	5.7	5.7	4.7	3.0	1.7	0.5		
	23,500			5.5	5.5	5.5	5.4	5.4	4.5	2.8	1.6	0.3		
10,000	15,000			12.3	12.2	12.2	11.0	8.7	6.4	4.5	2.6	0.7		
	16,000			11.2	11.1	11.1	9.9	7.8	5.6	3.9	2.1	0.3		
	17,000			10.2	10.1	10.1	9.0	7.0	5.0	3.3	1.6	0.0		
	18,000			9.3	9.2	9.2	8.2	6.3	4.4	2.8	1.2	-0.3		
	19,000			8.5	8.4	8.4	7.4	5.6	3.9	2.4	0.9	-0.6		
	20,000			7.7	7.7	7.6	6.8	5.0	3.3	1.9	0.5	-0.9		
	21,000			7.0	7.0	7.0	6.1	4.5	2.9	1.5	0.2	-1.1		
	22,000			6.4	6.4	6.3	5.5	4.0	2.4	1.2	-0.1	-1.4		
	22,750			6.0	5.9	5.9	5.1	3.6	2.1	0.9	-0.3	-1.6		
	23,000			5.8	5.8	5.8	5.0	3.5	2.0	0.8	-0.4	-1.6		
	23,500			5.5	5.5	5.5	4.7	3.3	1.8	0.6	-0.6	-1.8		
15,000	15,000			10.9	10.0	8.5	6.6	4.7	3.1	1.6	0.0			
	16,000			9.9	9.0	7.6	5.9	4.1	2.6	1.1	-0.3			
	17,000			9.0	8.2	6.9	5.2	3.6	2.2	0.8	-0.6			
	18,000			8.2	7.4	6.2	4.6	3.0	1.7	0.4	-0.9			
	19,000			7.4	6.7	5.5	4.0	2.6	1.3	0.1	-1.1			
	20,000			6.7	6.0	4.9	3.5	2.1	0.9	-0.2	-1.4			
	21,000			6.1	5.4	4.4	3.0	1.7	0.6	-0.5	-1.6			
	22,000			5.5	4.9	3.9	2.6	1.3	0.3	-0.8	-1.9			
	22,750			5.1	4.5	3.5	2.3	1.1	0.0	-1.0	-2.0			
	23,000			5.0	4.3	3.4	2.2	1.0	0.0	-1.1	-2.1			
	23,500			4.7	4.1	3.2	2.0	0.8	-0.2	-1.2	-2.2			
20,000	15,000			6.8	6.0	4.8	3.4	1.9	0.5	-0.9				
	16,000			6.0	5.3	4.2	2.8	1.5	0.2	-1.1				
	17,000			5.4	4.7	3.6	2.4	1.1	-0.1	-1.4				
	18,000			4.8	4.1	3.1	1.9	0.7	-0.4	-1.6				
	19,000			4.2	3.6	2.6	1.5	0.4	-0.7	-1.8				
	20,000			3.7	3.1	2.2	1.1	0.1	-1.0	-2.0				
	21,000			3.2	2.6	1.8	0.8	-0.2	-1.2	-2.2				
	22,000			2.7	2.2	1.4	0.4	-0.5	-1.5	-2.4				
	22,750			2.4	1.9	1.1	0.2	-0.7	-1.7	-2.6				
	23,000			2.3	1.8	1.0	0.1	-0.8	-1.7	-2.6				
	23,500			2.1	1.6	0.9	0.0	-0.9	-1.8	-2.7				
25,000	15,000			4.8	4.1	3.0	1.7	0.4	-0.8					
	16,000			4.1	3.5	2.4	1.2	0.0	-1.2					
	17,000			3.5	2.9	1.9	0.7	-0.4	-1.5					
	18,000			2.9	2.3	1.4	0.3	-0.8	-1.8					
	19,000			2.3	1.8	0.9	-0.2	-1.1	-2.1					
	20,000			1.8	1.3	0.5	-0.5	-1.5	-2.4					
	21,000			1.3	0.9	0.1	-0.9	-1.8	-2.7					
	22,000			0.9	0.4	-0.3	-1.3	-2.1	-3.0					
	22,750			0.6	0.1	-0.6	-1.5	-2.3	-3.2					
	23,000			0.5	0.0	-0.7	-1.6	-2.4	-3.2					
	23,500			0.3	-0.2	-0.9	-1.7	-2.5	-3.3					
30,000	15,000		2.1	1.8	1.3	0.6	-0.4	-1.3						
	16,000		1.6	1.2	0.8	0.1	-0.7	-1.6						
	17,000		1.1	0.8	0.3	-0.3	-1.1	-1.9						
	18,000		0.6	0.3	-0.1	-0.7	-1.4	-2.2						
	19,000		0.2	-0.1	-0.5	-1.0	-1.8	-2.5						
	20,000		-0.3	-0.5	-0.9	-1.4	-2.1	-2.8						
	21,000		-0.7	-0.9	-1.2	-1.7	-2.4	-3.0						
	22,000		-1.0	-1.3	-1.6	-2.0	-2.7	-3.3						
	22,750		-1.3	-1.5	-1.8	-2.3	-2.9	-3.5						
	23,000		-1.4	-1.6	-1.9	-2.3	-2.9	-3.5						
	23,500		-1.6	-1.8	-2.1	-2.5	-3.1	-3.6						
35,000	15,000		0.0	-0.3	-0.8	-1.4	-2.1							
	16,000		-0.5	-0.7	-1.2	-1.7	-2.4							
	17,000		-0.8	-1.1	-1.5	-2.0	-2.7							
	18,000		-1.2	-1.4	-1.8	-2.3	-2.9							
	19,000		-1.5	-1.8	-2.1	-2.6	-3.1							
	20,000		-1.9	-2.1	-2.4	-2.9	-3.4							
	21,000		-2.2	-2.4	-2.7	-3.1	-3.6							
	22,000		-2.5	-2.7	-3.0	-3.4	-3.8							
	22,750		-2.7	-2.9	-3.2	-3.5	-4.0							
	23,000		-2.8	-2.9	-3.2	-3.6	-4.0							
	23,500		-2.9	-3.1	-3.4	-3.7	-4.2							

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only.

ALT FT	WT LB	TEMPERATURE °C	-60	-50	-40	-30	-20
		°F	-80	-60	-40	-20	0
40,000	15,000		-1.7	-2.0	-2.4	-2.9	-3.4
	16,000		-2.0	-2.2	-2.6	-3.1	-3.6
	17,000		-2.2	-2.5	-2.8	-3.3	-3.8
	18,000		-2.5	-2.7	-3.1	-3.5	-3.9
	19,000		-2.8	-3.0	-3.3	-3.7	-4.1
	20,000		-3.0	-3.2	-3.5	-3.9	-4.3
	21,000		-3.2	-3.4	-3.7	-4.1	-4.4
	22,000		-3.5	-3.7	-3.9	-4.3	-4.6
	22,750		-3.6	-3.8	-4.1	-4.4	-4.7
	23,000		-3.7	-3.9	-4.1	-4.5	-4.8
	23,500		-3.8	-4.0	-4.2	-4.6	-4.9
45,000	15,000		-2.9	-3.2	-3.7	-4.1	
	16,000		-3.1	-3.4	-3.9	-4.2	
	17,000		-3.4	-3.6	-4.0	-4.3	
	18,000		-3.5	-3.8	-4.2	-4.5	
	19,000		-3.7	-3.9	-4.3	-4.6	
	20,000		-3.9	-4.1	-4.5	-4.8	
	21,000		-4.1	-4.3	-4.6	-4.9	
	22,000		-4.3	-4.5	-4.8	-5.0	
	22,750		-4.5	-4.6	-4.9	-5.1	
	23,000		-4.5	-4.7	-5.0	-5.2	
	23,500		-4.6	-4.7	-5.0	-5.3	
51,000	15,000		-5.3	-5.8	-6.2		
	16,000		-5.5	-6.0	-6.3		
	17,000		-5.7	-6.1	-6.5		
	18,000		-5.9	-6.3	-6.6		
	19,000		-6.1	-6.5	-6.8		
	20,000		-6.3	-6.7	-7.0		
	21,000		-6.5	-6.9	-7.1		
	22,000		-6.7	-7.1	-7.3		
	22,750		-6.9	-7.2	-7.5		
	23,000		-6.9	-7.3	-7.5		
	23,500		-7.1	-7.4	-7.6		

ABOVE LIMITS

ENROUTE CLIMB SPEED SCHEDULE:

Sea Level to 21,000 FT ..... 200 KIAS
21,000 FT to 29,000 FT..... 0.45 MI
29,000 to 49,000 FT..... 170 KIAS
49,000 to 51,000 FT..... 0.70 MI

NOTE: This speed schedule approximates best rate- of-climb speeds or, above the single-engine ceiling, the minimum sink-rate speed.

EXAMPLE:

1. Uncorrected Net Climb Gradient (from table).....9%
2. Reference Line
3. Anti-Ice Systems ..... FULL
4. Corrected Net Climb Gradient 7.5%

   Conditions:
   - Single Engine
   - Thrust ..... Max. Continuous
   - Gear .....UP
   - Flaps.....UP
   - Speed ..... (See Enroute Climb Speed Schedule)

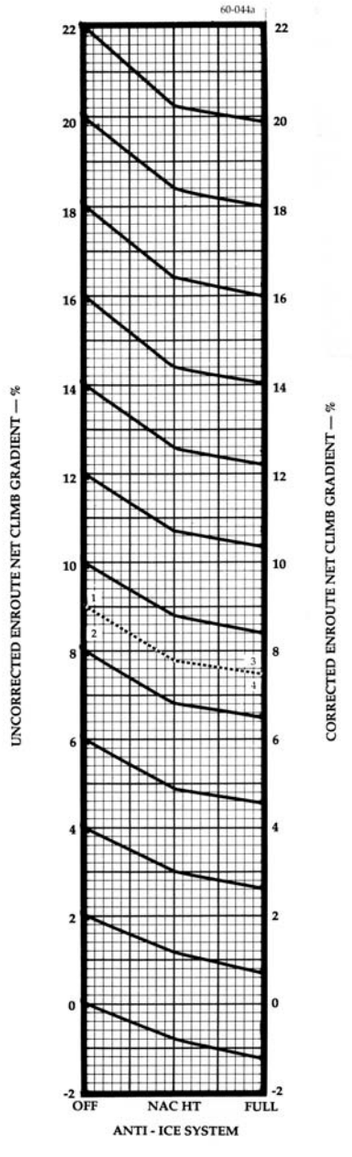


Figure 5-65

APPROACH AND LANDING CHARTS

The charts on the following pages present approach and landing climb gradients, maximum landing weights as limited by approach and landing climb performance, and landing weights as limited by maximum brake energy.

MAXIMUM LANDING WEIGHT

Landings must be made within the limitations of the maximum landing weight as governed by the LANDING WEIGHT LIMIT charts and by the performance determined from the ACTUAL LANDING DISTANCE and FACTORED LANDING DISTANCE (if applicable) charts. The heaviest weight at which the aircraft can land is the **lowest** of the following weights:

1. The maximum landing weight (design structural limit for landing) is 19,500 pounds (8,845 kg).
2. The landing weight limit for airport altitude and reported surface temperature as determined from the LANDING WEIGHT LIMIT charts.
3. The maximum landing weight for the runway and ambient conditions as determined from the ACTUAL LANDING DISTANCE and FACTORED LANDING DISTANCE (if applicable) charts.

NOTE

If the aircraft weight over the destination is greater than the lowest of the above weights, fuel must be burned off until the proper weight is achieved.

LANDING DISTANCE CHARTS

The ACTUAL LANDING DISTANCE chart shows the demonstrated landing distance in terms of altitude, outside air temperature and weight. The ACTUAL LANDING DISTANCE CORRECTION CHART shows the effects of wind, runway gradient, and anti-skid on or off. *On aircraft 60-079, 60-094 & subsequent, and prior aircraft incorporating SB 60-27-6,* the effects of manual spoilers are also included. The FACTORED LANDING DISTANCE chart shows the operational landing field length when a factored landing distance is required by applicable regulations. These charts may be used to determine either of the following:

1. The landing field length required given the airplane weight, runway gradient, pressure altitude, reported surface temperature, and wind.

LANDING DISTANCE CHARTS (Cont)

2. The maximum landing weight corresponding to a specific runway length, runway gradient, pressure altitude, reported surface temperature, and wind. Landing weight for runway length available may be determined by working through the chart in the opposite manner as finding landing distance. Landing weight determined in this manner may not be the limiting landing weight, refer to MAXIMUM LANDING WEIGHT.
3. Landing performance information above the maximum landing weight has been provided for abnormal conditions requiring an overweight landing. Refer to ABNORMAL AND OVERWEIGHT LANDINGS procedure, in Section IV.

CALCULATION OF CORRECTION FOR RUNWAYS WITH A GRADIENT GREATER THAN 2.0% AND LESS THAN OR EQUAL TO 2.4%

The information provided here is used to calculate landing corrections for dry conditions with runway gradients >2.0% and ≤2.4%.

DOWNHILL (NEGATIVE) GRADIENT

Landing Weight Limit

Determine Climb Weight Limit using the appropriate chart in this section. Additional correction is not required.

Determine Brake Energy Weight Limit using the appropriate chart in this section and assume runway has a -2.0% gradient. If necessary, adjust the Brake Energy Weight Limit by subtracting the appropriate weight from the table below.

Landing Weight Limit	
Downhill Gradient	**Brake Energy Weight Correction**
-2.1%	Subtract 50 pounds (22.7 kg)
-2.2%	Subtract 100 pounds (45.4 kg)
-2.3%	Subtract 150 pounds (68.1 kg)
-2.4%	Subtract 200 pounds (90.8 kg)

Landing Distance

Determine Landing Distance using the appropriate chart in this section and assume runway has a -2.2% gradient. Add 50 feet (15.25 m) to the Landing Distance for runway gradients -2.2% to -2.4% inclusive.

UPHILL (POSITIVE) GRADIENT

Landing Weight Limit

Determine Climb Weight Limit using the appropriate chart in this section. Adjust the Climb Weight Limit by subtracting the appropriate weight from the table below.

Landing Weight Limit	
Uphill Gradient	**Climb Weight Correction**
+2.1%	Subtract 125 pounds (56.7kg)
+2.2%	Subtract 250 pounds (113.4kg)
+2.3%	Subtract 375 pounds (170.1 kg)
+2.4%	Subtract 500 pounds (226.8 kg)

Determine the Brake Energy Weight Limit using the appropriate chart in this section and assume runway has a +2.2% gradient. Additional correction is not required.

Landing Distance

Determine Landing Distance using the appropriate chart in this section and assume runway has a +2.2% gradient. Additional correction is not required.

LANDING ON WET OR CONTAMINATED RUNWAY

Refer to the WET/CONTAMINATED RUNWAY DATA for guidance material pertaining to landing on a wet or contaminated runway.

LANDING PROCEDURE

The landing distances on the ACTUAL LANDING DISTANCE chart can be realized when following the landing procedure in the INTRODUCTION TO PERFORMANCE DATA at the beginning of this section.

APPROACH CLIMB AND LANDING CLIMB GRADIENT CHARTS

The APPROACH CLIMB GRADIENT and LANDING CLIMB GRADIENT Charts are read at the airport temperature and pressure altitude. The gradients will be achieved using the speeds shown in the LANDING SPEEDS Chart.

LANDING WEIGHT LIMIT AND ACTUAL LANDING DISTANCE — DELAYED BRAKE APPLICATION *(Aircraft 60-079, 60-094 & Subsequent, and Prior Aircraft Incorporating SB 60-27-6)*

An alternate landing procedure, using delayed brake application, is available and the associated performance is presented on the LANDING WEIGHT LIMIT AND ACTUAL LANDING DISTANCE — DELAYED BRAKE APPLICATION chart. This chart supplements the LANDING WEIGHT LIMIT and ACTUAL LANDING DISTANCE charts.

The landing procedure described in the INTRODUCTION TO PERFORMANCE DATA at the beginning of this section should be used except brakes are not applied until the aircraft slows to the Brake Application Speed determined from the LANDING WEIGHT LIMIT AND ACTUAL LANDING DISTANCE — DELAYED BRAKE APPLICATION chart, at which time maximum braking must be applied until the airplane comes to a complete stop.

NOTE

- This landing procedure is **not** valid for abnormal landing conditions.
- This landing procedure may only be used if the following conditions apply:
  - No tailwind component
  - The anti-skid system must be operational
  - Autospoilers must be used

APPROACH SPEEDS — NORMAL LANDINGS

Approach Climb Speed — VAPP, Flaps 8° — Gear Up
Landing Approach Speed — VREF, Flaps 40° — Gear down

VAPP and VREF — KIAS							
ALT FEET	WEIGHT LB	VAPP	VREF	ALT FEET	WEIGHT LB	VAPP	VREF
4000 and BELOW	15,000	135	124	10,000	15,000	136	124
	16,000	139	128		16,000	141	128
	17,000	143	131		17,000	145	132
	18,000	147	135		18,000	148	135
	19,000	150	138		19,000	152	139
	19,500	152	139		19,500	153	140
	20,000	**154**	**141**		20,000	**155**	**142**
	21,000	**157**	**144**		21,000	**158**	**145**
	22,000	**160**	**147**		22,000	**161**	**147**
	23,000	**163**	**149**		23,000	**164**	**150**
	23,100	**163**	**149**		23,100	**165**	**150**
5000	15,000	135	124	11,000	15,000	137	125
	16,000	140	128		16,000	142	129
	17,000	144	131		17,000	146	133
	18,000	147	135		18,000	150	136
	19,000	151	138		19,000	153	139
	19,500	152	139		19,500	155	141
	20,000	**154**	**141**		20,000	**156**	**142**
	21,000	**157**	**144**		21,000	**160**	**145**
	22,000	**160**	**147**		22,000	**163**	**148**
	23,000	**163**	**149**		23,000	**166**	**151**
	23,100	**163**	**150**		23,100	**166**	**151**
6000	15,000	135	124	12,000	15,000	137	125
	16,000	140	128		16,000	142	129
	17,000	144	131		17,000	146	133
	18,000	147	135		18,000	150	136
	19,000	151	138		19,000	153	139
	19,500	152	139		19,500	155	141
	20,000	**154**	**141**		20,000	**156**	**142**
	21,000	**157**	**144**		21,000	**160**	**145**
	22,000	**160**	**147**		22,000	**163**	**148**
	23,000	**163**	**149**		23,000	**166**	**151**
	23,100	**163**	**150**		23,100	**166**	**151**
7000	15,000	135	124	13,000	15,000	139	126
	16,000	140	126		16,000	144	130
	17,000	144	132		17,000	148	134
	18,000	148	135		18,000	152	137
	19,000	151	138		19,000	155	141
	19,500	153	140		19,500	157	142
	20,000	**154**	**141**		20,000	**159**	**144**
	21,000	**158**	**144**		21,000	**162**	**147**
	22,000	**161**	**147**		22,000	**165**	**150**
	23,000	**164**	**150**		23,000	**168**	**152**
	23,100	**164**	**150**		23,100	**169**	**153**
8000	15,000	135	124	14,000	15,000	139	126
	16,000	140	128		16,000	144	130
	17,000	144	132		17,000	148	134
	18,000	148	135		18,000	152	137
	19,000	151	138		19,000	155	141
	19,500	153	140		19,500	157	142
	20,000	**154**	**141**		20,000	**159**	**144**
	21,000	**158**	**144**		21,000	**162**	**147**
	22,000	**161**	**147**		22,000	**165**	**150**
	23,000	**164**	**150**		23,000	**168**	**152**
	23,100	**164**	**150**		23,100	**169**	**153**
9000	15,000	136	124				
	16,000	141	128				
	17,000	145	132				
	18,000	148	135				
	19,000	152	139				
	19,500	153	140				
	20,000	**155**	**142**				
	21,000	**158**	**145**				
	22,000	**161**	**147**				
	23,000	**164**	**150**				
	23,100	**165**	**150**				

Figures in shaded area are above maximum certified landing weight.

Figure 5-66

APPROACH SPEEDS — ABNORMAL LANDINGS

GEAR DOWN

1.3 Vs — KIAS				
ALT FEET	WEIGHT LB	FLAPS UP (0°)	8°	20°
4000 and BELOW	15,000	139	136	131
	16,000	144	140	135
	17,000	148	144	139
	18,000	151	148	142
	19,000	155	151	146
	19,500	157	153	147
	20,000	**158**	**155**	**149**
	21,000	**161**	**158**	**152**
	22,000	**165**	**161**	**155**
	23,000	**168**	**164**	**158**
	23,100	**168**	**164**	**158**
6000	15,000	139	136	131
	16,000	144	141	135
	17,000	148	145	139
	18,000	152	148	143
	19,000	155	152	146
	19,500	157	153	148
	20,000	**158**	**155**	**149**
	21,000	**162**	**158**	**152**
	22,000	**165**	**161**	**155**
	23,000	**168**	**164**	**158**
	23,100	**168**	**165**	**158**
8000	15,000	139	136	131
	16,000	144	141	136
	17,000	148	145	139
	18,000	152	149	143
	19,000	155	152	146
	19,500	157	154	148
	20,000	**159**	**155**	**149**
	21,000	**162**	**159**	**153**
	22,000	**165**	**162**	**156**
	23,000	**168**	**165**	**158**
	23,100	**168**	**165**	**159**
10,000	15,000	140	137	132
	16,000	144	142	136
	17,000	148	146	140
	18,000	152	149	144
	19,000	156	153	147
	19,500	157	155	149
	20,000	**159**	**156**	**150**
	21,000	**162**	**159**	**153**
	22,000	**165**	**163**	**156**
	23,000	**168**	**166**	**159**
	23,100	**169**	**166**	**159**
12,000	15,000	141	138	133
	16,000	145	143	137
	17,000	149	147	141
	18,000	153	151	145
	19,000	156	154	148
	19,500	158	156	150
	20,000	**160**	**158**	**151**
	21,000	**163**	**161**	**154**
	22,000	**166**	**164**	**157**
	23,000	**169**	**167**	**160**
	23,100	**170**	**167**	**161**
14,000	15,000	142	140	135
	16,000	147	145	139
	17,000	151	149	143
	18,000	154	153	147
	19,000	158	156	150
	19,500	160	158	152
	20,000	**161**	**160**	**153**
	21,000	**165**	**163**	**158**
	22,000	**168**	**166**	**160**
	23,000	**171**	**169**	**162**
	23,100	**171**	**170**	**163**

Figures in shaded area are above maximum certified landing weight.

Figure 5-67

APPROACH CLIMB GRADIENT

EFFECTIVITY
All

UNCORRECTED APPROACH GROSS CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	TEMPERATURE °C -40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F -40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000	16 9	16 8	16 8	16 8	16.7	16.6	16 5	15.6	14 3	13.0	11.7	10.4		
	16,000	15 1	15.1	15.0	15.0	14.9	14.8	14.8	13 9	12 7	11 5	10.3	9 1		
	17,000	13.5	13 5	13 5	13 5	13.4	13.3	13 2	12.4	11.3	10.2	9 1	8 0		
	18,000	12.2	12 2	12 1	12 1	12.0	11.9	11 9	11.1	10 1	9.0	8.0	7.0		
	19,000	11 0	11.0	10 9	10 9	10.8	10.8	10.7	10 0	9 0	8.0	7 1	6.1		
	20,000	9 9	9.9	9 9	9.9	9 8	9.7	9 7	9 0	8 0	7.1	6 2	5.3		
	21,000	8.9	8 9	8 9	8 9	8 8	8.8	8 7	8 0	7.2	6.3	5 4	4 6		
	22,000	8 1	8.1	8.0	8 0	8.0	7 9	7 9	7.2	6 4	5.6	4 7	3 9		
	22,750	7 5	7.5	7 4	7 4	7.4	7.3	7.3	6 6	5 8	5.1	4.3	3.5		
	23,000	7 3	7 3	7 3	7.2	7 2	7.1	7.1	6.5	5 7	4.9	4.1	3 3		
	23,100	7.2	7.2	7.2	7.2	7.1	7.0	7.0	6.4	5.6	4.8	4.1	3.3		
2000	15,000	16 7	16 7	16.7	16 6	16.5	16.4	15 0	13.7	12 5	11.3	10.2	9.0		
	16,000	14 9	14.9	14.9	14 9	14.8	14.6	13 4	12.1	11 0	9.9	8.9	7.8		
	17,000	13.4	13 4	13 4	13.3	13.3	13.1	11 9	10.8	9 8	8 7	7.7	6.7		
	18,000	12.1	12.0	12 0	12 0	11.9	11.8	10.7	9 6	8 6	7 7	6.7	5.8		
	19,000	10.9	10 9	10 8	10.8	10.8	10.6	9 6	8.5	7 6	6.8	5.9	5.0		
	20,000	9.8	9.8	9.8	9 8	9.7	9.6	8 6	7.6	6.7	5.9	5.1	4.3		
	21,000	8.9	8.8	8 8	8.8	8.8	8.6	7.7	6.7	6.0	5.2	4.4	3.6		
	22,000	8.0	8 0	8.0	8.0	7.9	7.8	6.9	6 0	5.2	4 5	3.7	3.0		
	22,750	7.4	7.4	7.4	7.4	7.3	7 2	6.3	5.5	4.7	4 0	3.3	2.6		
	23,000	7.2	7.2	7.2	7.2	7.1	7.0	6.1	5.3	4.6	3 9	3 2	2.5		
	23,100	7.1	7.1	7.1	7.1	7.0	6.9	6.1	5.2	4.5	3 8	3.1	2.4		
4000	15,000	16.7	16 7	16.7	16.6	16.5	14.5	13.2	12 0	10.8	9 5	8.3			
	16,000	14.9	14 9	14.9	14 9	14.8	12.9	11 7	10.6	9.4	8 3	7.2			
	17,000	13.4	13.4	13.3	13.3	13.3	11 5	10.4	9.3	8.2	7 2	6.1			
	18,000	12.1	12 0	12.0	12 0	11.9	10 2	9 2	8.2	7.2	6.2	5.2			
	19,000	10 9	10 8	10.8	10 8	10 7	9.1	8 2	7.3	6 3	5.4	4.5			
	20,000	9 8	9 8	9 8	9.7	9 7	8.2	7.3	6.4	5 5	4.6	3.7			
	21,000	8.8	8.8	8 8	8.8	8.7	7.3	6.4	5.6	4.8	3.9	3.1			
	22,000	8 0	8 0	7 9	7.9	7 9	6.5	5.7	4.9	4 1	3.3	2.5			
	22,750	7.4	7.4	7 3	7.3	7.3	6.0	5.2	4.4	3 7	2.9	2.1			
	23,000	7 2	7 2	7 2	7 1	7.1	5.8	5.0	4.3	3 5	2.8	2.0			
	23,100	7 1	7.1	7.1	7.1	7.0	5.7	5 0	4.2	3 5	2.7	2.0			
6000	15,000	16 5	16 5	16 4	16 4	15.5	12.9	11 5	10.2	9.2	8.1				
	16,000	14.7	14.7	14 7	14.7	13.8	11.3	10.1	8.9	7.9	6.9				
	17,000	13 2	13.2	13 2	13 2	12.3	10.0	8.9	7.8	6.9	5.9				
	18,000	11 9	11 9	11.9	11 8	11.0	8.9	7.8	6.8	5.9	5.1				
	19,000	10.7	10 7	10.7	10 7	9.9	7.9	6 9	5.9	5.1	4.3				
	20,000	9.7	9 7	9.6	9.6	8.9	7.0	6 0	5.1	4.3	3.6				
	21,000	8.7	8.7	8.7	8.7	7.9	6.2	5.3	4.4	3.7	3.0				
	22,000	7 9	7.9	7.9	7.8	7.1	5.4	4.6	3.7	3.1	2.4				
	22,750	7.3	7 3	7 3	7.3	6.5	4.9	4 1	3.3	2.6	2.0				
	23,000	7.1	7.1	7 1	7.1	6.4	4.8	4.0	3.2	2 5	1.9				
	23,100	7.0	7.0	7.0	7.0	6.3	4.7	3.9	3.1	2.5	1.8				
8000	15,000	16.6	16 5	16.5	16.2	13.4	11.0	9.9	8 7	7.5	6.3				
	16,000	14.8	14.8	14.7	14.4	11.9	9 7	8.6	7 5	6.4	5.3				
	17,000	13.3	13 2	13.2	12 9	10.5	8.5	7.4	6.4	5.4	4.4				
	18,000	11.9	11 9	11 9	11.6	9 3	7.4	6 5	5.5	4 6	3.6				
	19,000	10.7	10.7	10.7	10.4	8.3	6.5	5.6	4.7	3 8	2.9				
	20,000	9.7	9.7	9.6	9.4	7.4	5.7	4 8	4.0	3.1	2.3				
	21,000	8.7	8.7	8.7	8.4	6.5	4.9	4.1	3.3	2.5	1.8				
	22,000	7.9	7.9	7.8	7.6	5.8	4.3	3.5	2 7	2.0	1.2				
	22,750	7.3	7 3	7.3	7.0	5.3	3 8	3.1	2 3	1.6	0.8				
	23,000	7 1	7.1	7.1	6.8	5.1	3.6	2.9	2 2	1.5	0.8				
	23,100	7.0	7.0	7.0	6.7	5.0	3.6	2.9	2.2	1.5	0.7				
10000	15,000	16.7	16 7	16.4	14.0	11.5	9 4	8.3	7 2	6.1					
	16,000	14.9	14.9	14.7	12 4	10.1	8.1	7 1	6.1	5.1					
	17,000	13.4	13.3	13.1	11.0	8.9	7.0	6 1	5.2	4.2					
	18,000	12.0	11.8	11.8	9.8	7.8	6.1	5 2	4.3	3.5					
	19,000	10.8	10.8	10.6	8.7	6.9	5.2	4.4	3.6	2.8					
	20,000	9.8	9 7	9.6	7.8	6.0	4.5	3.7	2.9	2.2					
	21,000	8 8	8.8	8.6	6.9	5.2	3.8	3.1	2.3	1.6					
	22,000	7.9	7.9	7.8	6.2	4 6	3.2	2.5	1.8	1.1					
	22,750	7.3	7.3	7.2	5.6	4.1	2.8	2.1	1.4	0.8					
	23,000	7.2	7 1	7.0	5.5	3 9	2 6	2.0	1 3	0.7					
	23,100	7.1	7.1	6.9	5 4	3.9	2.6	1.9	1.3	0.6					
12000	15,000	16.3	15.7	14.2	12.0	9 9	7.9	6 9	5.8						
	16,000	14.5	14.1	12.7	10.6	8.7	6.7	5 8	4.8						
	17,000	13.0	12.6	11.3	9.3	7.5	5 7	4.9	4.0						
	18,000	11.7	11.3	10.1	8.3	6.6	4.9	4 0	3.2						
	19,000	10.5	10.2	9.0	7.3	5.7	4.1	3.3	2.5						
	20,000	9.5	9.2	8.0	6.4	4.9	3.4	2.7	1.9						
	21,000	8.6	8 3	7.2	5.6	4.2	2.8	2.1	1.4						
	22,000	7.7	7 5	6.4	5.0	3.6	2.3	1.6	0.9						
	22,750	7.2	7 0	5 9	4.5	3 2	1.9	1.2	0.6						
	23,000	7.0	6 8	5 7	4.3	3 0	1 8	1.1	0.5						
	23,100	6.9	6.7	5.7	4.3	3.0	1.7	1.1	0.4						
14000	15,000	14.4	13.6	12.3	10.2	8.2	6.4	5 4	4.5						
	16,000	12.9	12.1	10.8	8.9	7.1	5.3	4.5	3.6						
	17,000	11 5	10.8	9.6	7.8	6.0	4.4	3.6	2.8						
	18,000	10.3	9.7	8.5	6.8	5.2	3.6	2.9	2.1						
	19,000	9.3	8.6	7.5	5.9	4.4	2.9	2.2	1.5						
	20,000	8.3	7.7	6.7	5.1	3.7	2.3	1.7	1.0						
	21,000	7.5	6.9	5.9	4.4	3.1	1.8	1:2	0.5						
	22,000	6.8	6 2	5 2	3 8	2 5	1.3	0.7	0.1						
	22,750	6.2	5.7	4.7	3.4	2.1	1.0	0.4	-0.2						
	23,000	6.1	5.5	4 6	3.2	2.0	0 8	0.3	-0.3						
	23,100	6.0	5.5	4.5	3.2	1.9	0.8	0.2	-0.3						

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Approach Climb Gradient (from table) 4.4%
2. Headwind ..... 30 Kts
3. Reference Line
4. Anti-Ice Systems ..... FULL
5. Corrected Approach Climb Gradient 2.4%

   Conditions:
   - Single Engine
   - Thrust ..... Takeoff
   - Gear ..... UP
   - Flaps ..... 8°
   - Speed ..... 1.3 Vsi

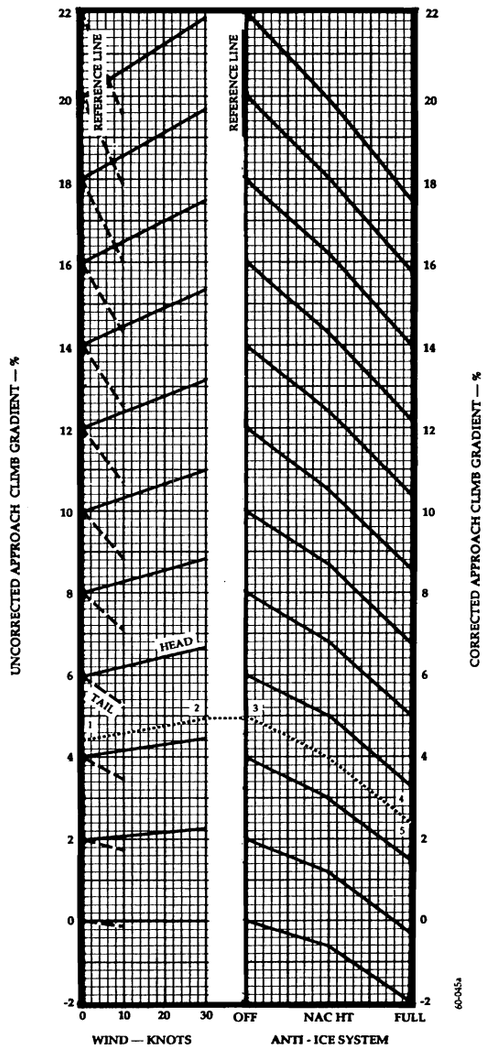


Figure 5-68

LANDING CLIMB GRADIENT

EFFECTIVITY
All

UNCORRECTED LANDING GROSS CLIMB GRADIENT — %

ALT FEET	WEIGHT LB	°C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		37.2	37.1	37.1	37 0	36 8	36.5	36 4	34.3	31.2	28.2	25.3	22.5		
	16,000		32.9	32.8	32.8	32.7	32 5	32.3	32.2	30.3	27.5	24.8	22 2	19 6		
	17,000		29.3	29.3	29.2	29 2	29.0	28.8	28 7	26.9	24.4	22 0	19 6	17 2		
	18,000		26.3	26.3	26.3	26 2	26.0	25 9	25.8	24.1	21.8	19.6	17 3	15.1		
	19,000		23.8	23.7	23.7	23.7	23 5	23.3	23.2	21.7	19.6	17.5	15.4	13.3		
	20,000		21.5	21.5	21.4	21.4	21.2	21.1	21.0	19.6	17 6	15.6	13.7	11.7		
	21,000		19.5	19.5	19.4	19 4	19.3	19.1	19 0	17 7	15.8	14 0	12.1	10.3		
	22,000		17.7	17.7	17.7	17.6	17.5	17 3	17.3	16.0	14 2	12 5	10 7	9.0		
	22,750		16.5	16.5	16 4	16.4	16 3	16.1	16.1	14.8	13.1	11 5	9 8	8.2		
	23,000		16.1	16.1	16.0	16.0	15.9	15 8	15.7	14.4	12 8	11.1	9 5	7.9		
	23,100		15.9	15.9	15.9	15.9	15.7	15.6	15.5	14.3	12.6	11.0	9.4	7.8		
2000	15,000		36 7	36.6	36 6	36.6	36.3	36.1	32 9	29.8	27.1	24 5	21 9	19.4		
	16,000		32 4	32.4	32 4	32.3	32.1	31.9	29.0	26.2	23.8	21.4	19 1	16.8		
	17,000		29.0	28.9	28 9	28.9	28 7	28.4	25 8	23.3	21.0	18.9	16.7	14.6		
	18,000		26.1	26.0	26 0	26.0	25 8	25.6	23 1	20.8	18.7	16.7	14.7	12.7		
	19,000		23 5	23.5	23.5	23.4	23 3	23.0	20 8	18.6	16 7	14.8	12.9	11.1		
	20,000		21.3	21.3	21.2	21.2	21 0	20.8	18 7	16.6	14 9	13 1	11 3	9.5		
	21,000		19.3	19.3	19.2	19.2	19 1	18.8	16 9	14.9	13.2	11 6	9 9	8.3		
	22,000		17.5	17.5	17.5	17 5	17.3	17.1	15 2	13.4	11.8	10.2	8.7	7.1		
	22,750		16.3	16.3	16.3	16.3	16.1	15.9	14 1	12.3	10.8	9.3	7 8	6.3		
	23,000		15.9	15 9	15.9	15.9	15.7	15.5	13.7	12.0	10.5	9.0	7.5	6.1		
	23,100		15.8	15.8	15.7	15 7	15.6	15.4	13 6	11.9	10.4	8.9	7.4	6.0		
4000	15,000		36.6	36.6	36.5	36 5	36.3	31.5	28.7	25.9	23.2	20.5	17.9			
	16,000		32.5	32.4	32.4	32.3	32.2	27.9	25.3	22.8	20.3	17.8	15.4			
	17,000		29.0	29.0	28.9	28 9	28.7	24.8	22 4	20.1	17.8	15.6	13.4			
	18,000		26.1	26.0	26.0	25 9	25.8	22.2	20.0	17 8	15.7	13.6	11.8			
	19,000		23 5	23.5	23.4	23.4	23.3	19 9	17.8	15.8	13 9	11.9	10.0			
	20,000		21 3	21.2	21 2	21.2	21.0	17 9	16.0	14 1	12.2	10.4	8.6			
	21,000		19 3	19.3	19.2	19.2	19.1	16.1	14.3	12 5	10.8	9.0	7.3			
	22,000		17 5	17.5	17 5	17.4	17.3	14.5	12.8	11 1	9 5	7.8	6.2			
	22,750		16.3	16.3	16 2	16.2	16.1	13 4	11.8	10 2	8.6	7.0	5.4			
	23,000		15.9	15.9	15 9	15.8	15.7	13 0	11.4	9.9	8.3	6.7	5.2			
	23,100		15.8	15.7	15.7	15.7	15.6	12 9	11.3	9.7	8.2	6 6	5.1			
6000	15,000		36.0	36.0	35.9	35.9	34.1	27 9	24.9	22 1	19.7	17.4				
	16,000		32.0	31.9	31 9	31.8	30.1	24 6	21.9	19 2	17.1	15.0				
	17,000		28.6	28.5	28.5	28.4	26.8	21.7	19.3	16.8	14.9	12.9				
	18,000		25.7	25.7	25.6	25.6	24.0	19 3	17.1	14.8	13.0	11.2				
	19,000		23.2	23.1	23 1	23.1	21.6	17.2	15.1	13.0	11.3	9.6				
	20,000		21.0	20.9	20 9	20.9	19 4	15 4	13.4	11 4	9.8	8.2				
	21,000		19.0	19 0	19 0	18.9	17 5	13 7	11.9	10 0	8.5	7.0				
	22,000		17.3	17 2	17.2	17.2	15.8	12 2	10.5	8.7	7.3	5.9				
	22,750		16.1	16.1	16.0	16.0	14 7	11.2	9.6	7.9	6.5	5.1				
	23,000		15.7	15.7	15.6	15.6	14 3	10.9	9.2	7 6	6.2	4.9				
	23,100		15.6	15.5	15.5	15.5	14.2	10.8	9.1	7.5	6.1	4.8				
8000	15,000		36.3	36.3	36.2	35.4	29.2	23.8	21 2	18.7	16 2	13.7				
	16,000		32.2	32.1	32.1	31.4	25.7	20.8	18 5	16.2	13 9	11.6				
	17,000		28.7	28.7	28.6	28.0	22.8	18.3	16 1	14.0	11.9	9.8				
	18,000		25.8	25 8	25.7	25.1	20.3	16.2	14.1	12.1	10.2	8.2				
	19,000		23.3	23.2	23 2	22.6	18.1	14.3	12 4	10.5	8.7	6.8				
	20,000		21.0	21.0	21.0	20.4	16.2	12 6	10.8	9.1	7.3	5.6				
	21,000		19.1	19 0	19.0	18.5	14 5	11.1	9.5	7.8	6.2	4.5				
	22,000		17.3	17.3	17.2	16 7	13.0	9.8	8.2	6.6	5.1	3.5				
	22,750		16.1	16.1	16 0	15.5	11.9	8.9	7.4	5.9	4.4	2.9				
	23,000		15 7	15.7	15.6	15.2	11.6	8.6	7 1	5.6	4.1	2.7				
	23,100		15.6	15.5	15.5	15.0	11.5	8.5	7.0	5.5	4.0	2.6				
10000	15,000		36.6	36.5	36 0	30.3	24.9	20.1	17.8	15.5	13.3					
	16,000		32.4	32.4	31.9	26.7	21.8	17.5	15 3	13.2	11.2					
	17,000		28.9	28.9	28.4	23.7	19.2	15.2	13 2	11.3	9.4					
	18,000		26.0	25.9	25.6	21.2	17 0	13 3	11.4	9.6	7.8					
	19,000		23.4	23.4	23.0	19.0	15.0	11 6	9.9	8.2	6.5					
	20,000		21.2	21.1	20.8	17.0	13.3	10.1	8.5	6 9	5.3					
	21,000		19.2	19.2	18.9	15.3	11.8	8.7	7.2	5.7	4.2					
	22,000		17.4	17.4	17.1	13.7	10.4	7.5	6 1	4.7	3.2					
	22,750		16.2	16.2	15.9	12.7	9.5	6.7	5.3	3.9	2.8					
	23,000		15.8	15.8	15 5	12.3	9.2	6.4	5.1	3.7	2.4					
	23,100		15.7	15.6	15.4	12.2	9.0	6.3	5.0	3.6	2.3					
12000	15,000		35.4	34.0	30.8	26.0	21.4	16.9	14.8	12.8						
	16,000		31.4	30.2	27.2	22.8	18.6	14 5	12 5	10.5						
	17,000		28.0	27.0	24 2	20.1	16.2	12 5	10 6	8.8						
	18,000		25.2	24.2	21.6	17.8	14.2	10.7	9.0	7.3						
	19,000		22.7	21 9	19.4	15.8	12 5	9.2	7 6	5.9						
	20,000		20.5	19.8	17.4	14.1	10 9	7.8	6.3	4.8						
	21,000		18.6	17.9	15.7	12.5	9.5	6.6	5.2	3.7						
	22,000		16.8	16.2	14.1	11.1	8.3	5.5	4.1	2.8						
	22,750		15.6	15.1	13.0	10.1	7.4	4.8	3.4	2.1						
	23,000		15.3	14.7	12.7	9.8	7.2	4.5	3.2	1.9						
	23,100		15.1	14.6	12.5	9.7	7.0	4.4	3.1	1.8						
14000	15,000		30.8	29.0	26 1	21.7	17.5	13.6	11.6	9.7						
	16,000		27.3	25.6	23.0	18.9	15.1	11.4	9.6	7.8						
	17,000		24.3	22.8	20.3	16.5	12.9	9.6	7.9	6.2						
	18,000		21.8	20.4	18 0	14.5	11.2	8.0	6.4	4.9						
	19,000		19.6	18.2	16 0	12.7	9.6	6.6	5.2	3.7						
	20,000		17.6	16.4	14 3	11.1	8.2	5.4	4.0	2.7						
	21,000		15.9	14 7	12.7	9.7	6.9	4.3	3.0	1.7						
	22,000		14.3	13.2	11.3	8.5	5.8	3.3	2.1	0.9						
	22,750		13.3	12.2	10.3	7 6	5 1	2.7	1.5	0.3						
	23,000		12.9	11.9	10.0	7 3	4.8	2 4	1.3	0.1						
	23,100		12.8	11.8	9.9	7.2	4.7	2.4	1.2	0.0						

ABOVE LIMITS

Figures in shaded area are above engine temperature limits and are provided for interpolation only

EXAMPLE:

1. Uncorrected Landing Climb Gradient (from table) 8%
2. Headwind ..... 30 Kts
3. Reference Line
4. Anti-Ice Systems ..... Nacelle Heat
5. Corrected Landing Climb Gradient 7.2%

   Conditions:
   - Two Engines
   - Thrust ..... Takeoff
   - Gear ..... DN
   - Flaps ..... 40°
   - Speed ..... 1.3 V_{S0}

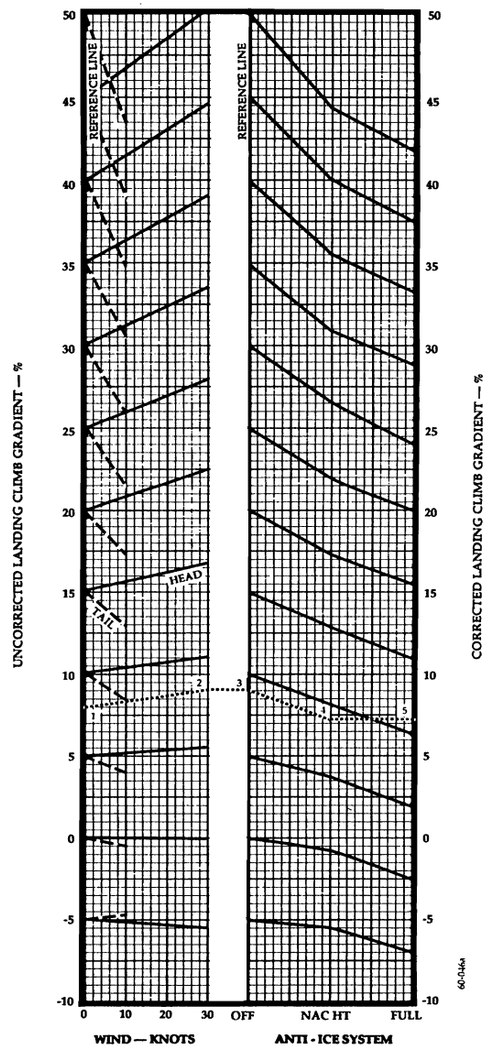
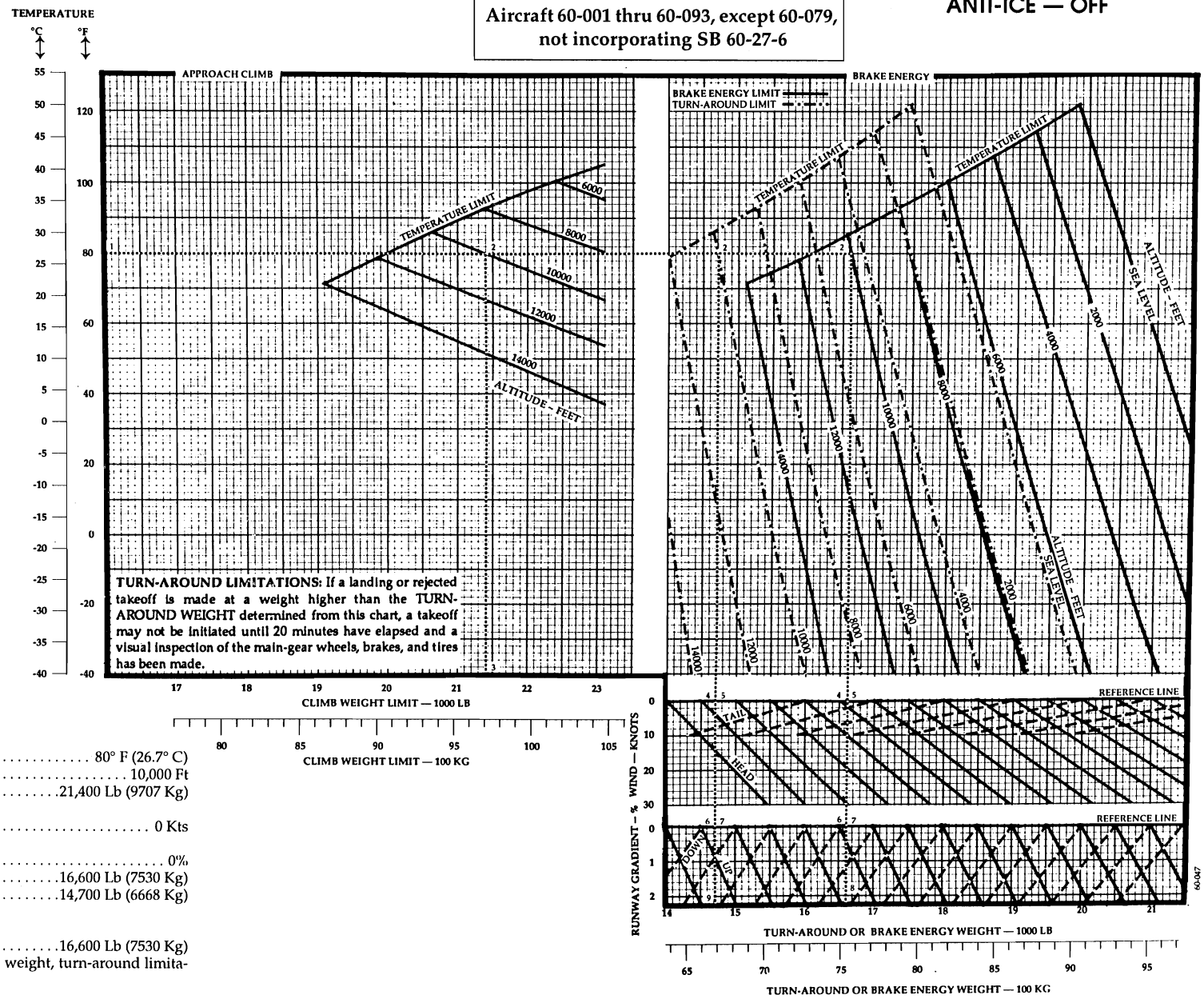


Figure 5-69

LANDING WEIGHT LIMIT
ANTI-ICE — OFF

EFFECTIVITY
Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6



EXAMPLE:

1. Temperature ..... 80° F (26.7° C)
2. Altitude ..... 10,000 Ft
3. Climb Weight Limit ..... 21,400 Lb (9707 Kg)
4. Reference Line
5. Wind ..... 0 Kts
6. Reference Line
7. Runway Gradient 0%
8. Brake Energy Weight Limit ..... 16,600 Lb (7530 Kg)
9. Turn-Around Weight Limit ..... 14,700 Lb (6668 Kg)

The most limiting condition is Brake Energy

- Landing Weight Limit ..... 16,600 Lb (7530 Kg)
- If landing is made above the turn-around weight, turn-around limitations must be observed.

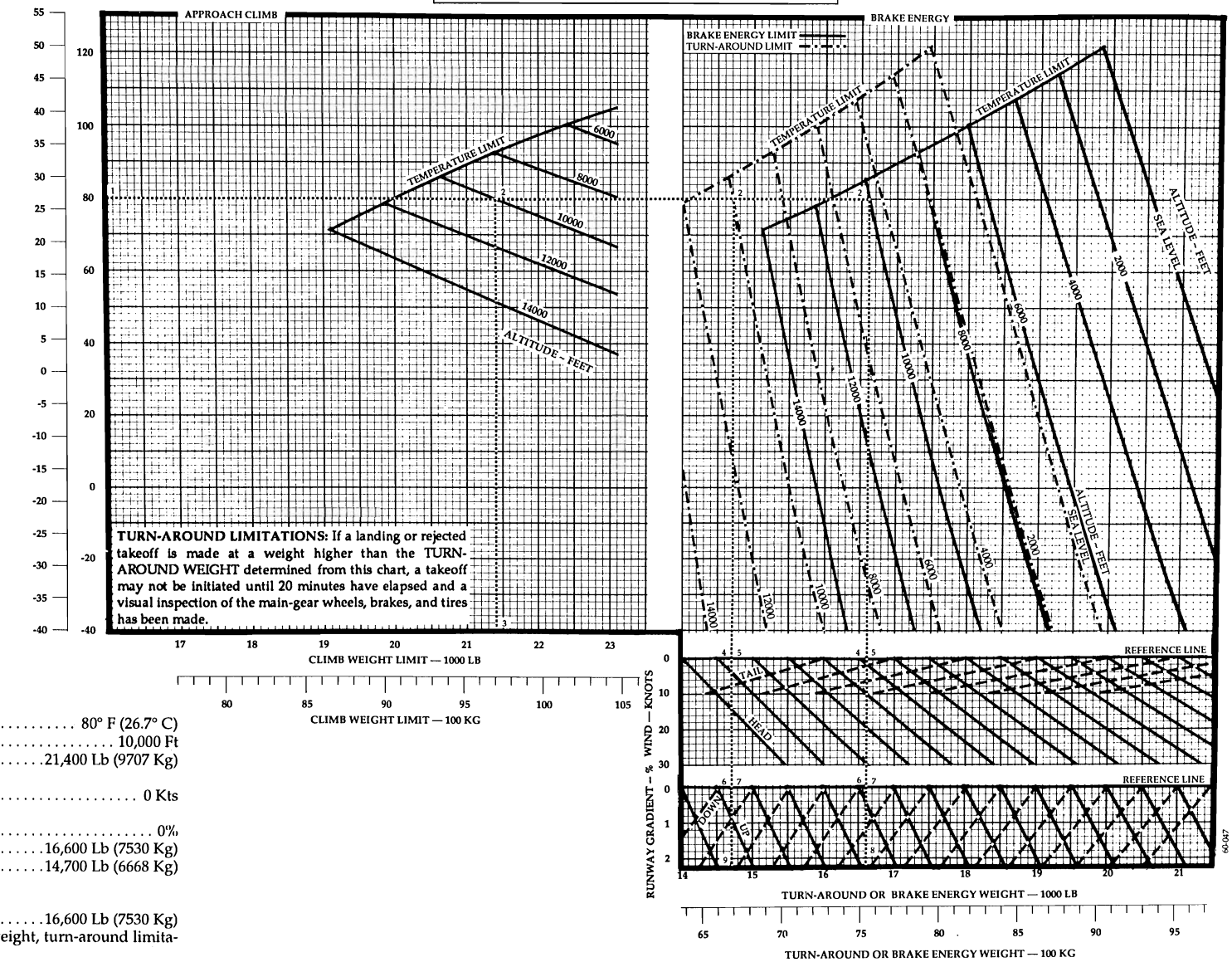
NOTE: The value obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, and the landing weight for the runway length available.

Figure 5-70

LANDING WEIGHT LIMIT
ANTI-ICE — OFF
MANUAL SPOILERS

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6



EXAMPLE:

1. Temperature ..... 80° F (26.7° C)
2. Altitude ..... 10,000 Ft
3. Climb Weight Limit ..... 21,400 Lb (9707 Kg)
4. Reference Line
5. Wind ..... 0 Kts
6. Reference Line
7. Runway Gradient 0%
8. Brake Energy Weight Limit ..... 16,600 Lb (7530 Kg)
9. Turn-Around Weight Limit ..... 14,700 Lb (6668 Kg)

The most limiting condition is Brake Energy

- Landing Weight Limit ..... 16,600 Lb (7530 Kg)
- If landing is made above the turn-around weight, turn-around limitations must be observed.

NOTE: The value obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, and the landing weight for the runway length available.

Figure 5-70.1

EFFECTIVITY

Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6.

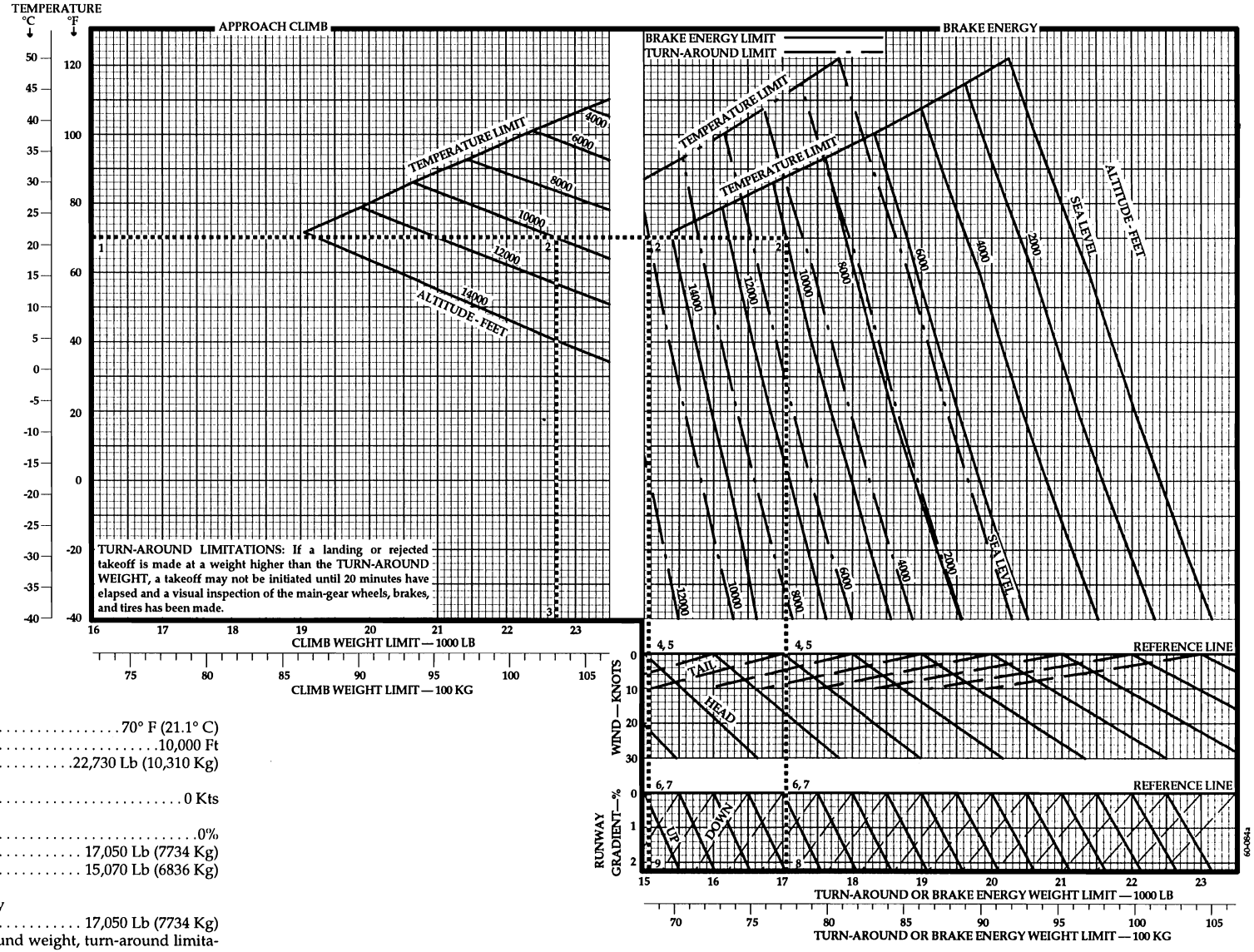
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Figure 5-71

LANDING WEIGHT LIMIT
ANTI-ICE — OFF
AUTOSPOILERS

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6



EXAMPLE:

1. Temperature ..... 70° F (21.1° C)
2. Altitude ..... 10,000 Ft
3. Climb Weight Limit ..... 22,730 Lb (10,310 Kg)
4. Reference Line
5. Wind ..... 0 Kts
6. Reference Line
7. Runway Gradient 0%
8. Brake Energy Weight Limit ..... 17,050 Lb (7734 Kg)
9. Turn-Around Weight Limit ..... 15,070 Lb (6836 Kg)

The most limiting condition is Brake Energy

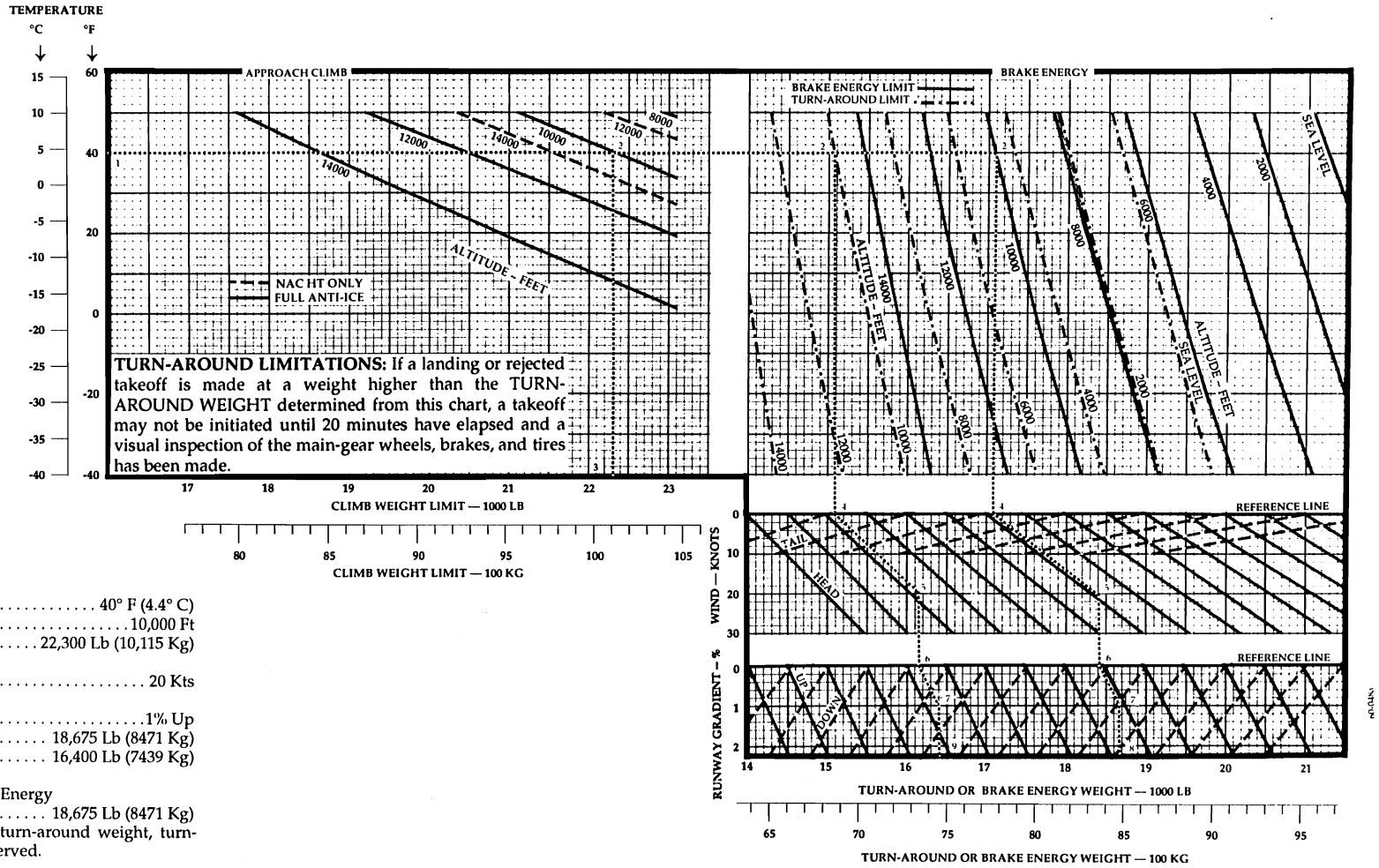
- Landing Weight Limit ..... 17,050 Lb (7734 Kg)
- If landing is made above the turn-around weight, turn-around limitations must be observed.

NOTE: The value obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, and the landing weight for the runway length available.

Figure 5-71.1

LANDING WEIGHT LIMIT
ANTI-ICE — ON

EFFECTIVITY
Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6



EXAMPLE:

1. Temperature ..... 40° F (4.4° C)
2. Altitude (FULL ANTI-ICE) ..... 10,000 Ft
3. Climb Weight Limit ..... 22,300 Lb (10,115 Kg)
4. Reference Line
5. Headwind ..... 20 Kts
6. Reference Line
7. Runway Gradient ..... 1% Up
8. Brake Energy Weight Limit ..... 18,675 Lb (8471 Kg)
9. Turn-Around Weight Limit ..... 16,400 Lb (7439 Kg)

The most limiting condition is Brake Energy

- Landing Weight Limit ..... 18,675 Lb (8471 Kg)
- If landing is made above the turn-around weight, turn-around limitations must be observed.

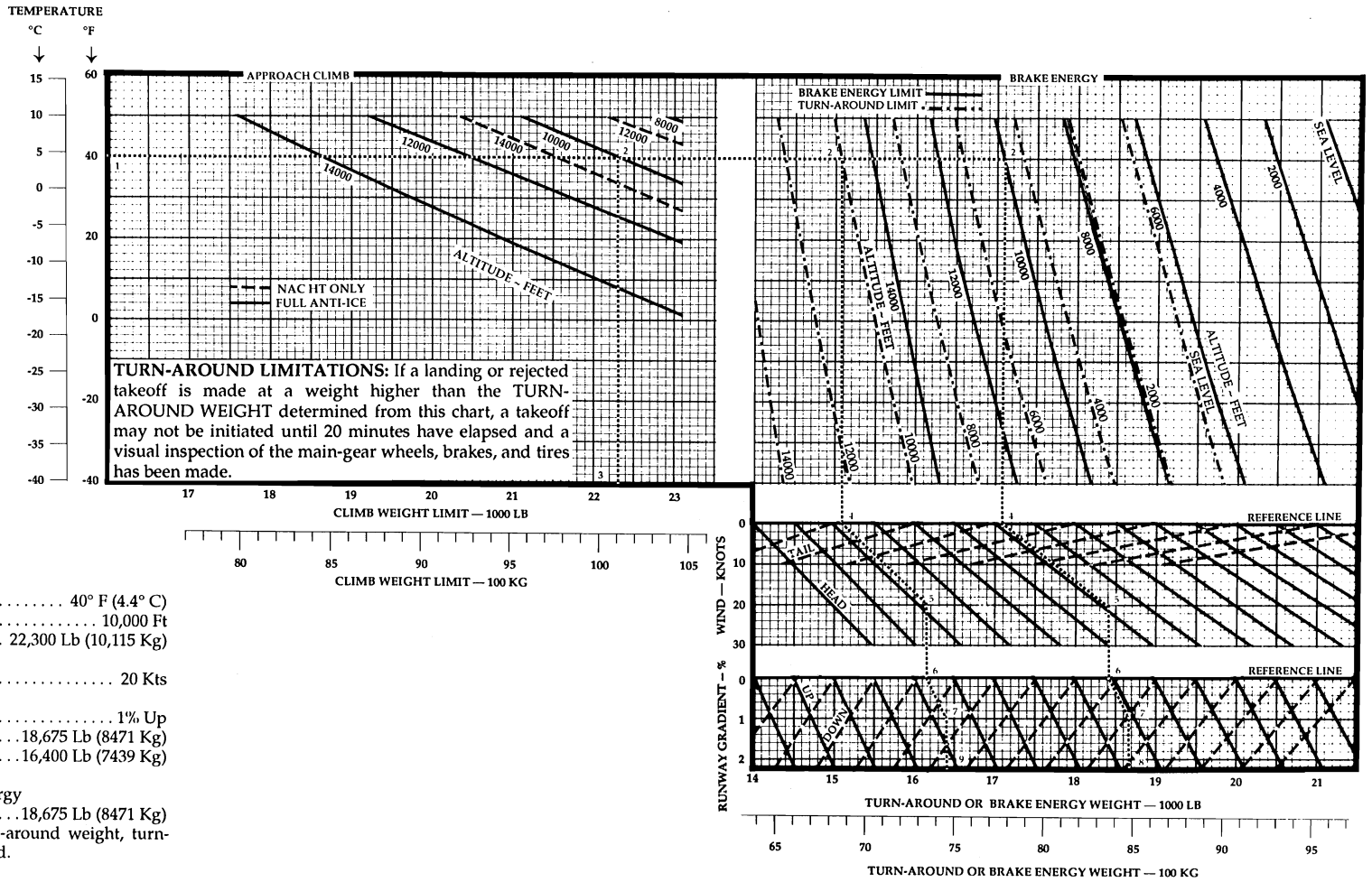
NOTE: The value obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, and the landing weight for the runway length available.

Figure 5-72

LANDING WEIGHT LIMIT
ANTI-ICE — ON
MANUAL SPOILERS

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6



EXAMPLE:

1. Temperature ..... 40° F (4.4° C)
2. Altitude (FULL ANTI-ICE) ..... 10,000 Ft
3. Climb Weight Limit ..... 22,300 Lb (10,115 Kg)
4. Reference Line
5. Headwind ..... 20 Kts
6. Reference Line
7. Runway Gradient ..... 1% Up
8. Brake Energy Weight Limit ..... 18,675 Lb (8471 Kg)
9. Turn-Around Weight Limit ..... 16,400 Lb (7439 Kg)

The most limiting condition is Brake Energy

- Landing Weight Limit ..... 18,675 Lb (8471 Kg)
- If landing is made above the turn-around weight, turn-around limitations must be observed.

NOTE: The value obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, and the landing weight for the runway length available.

Figure 5-72.1

EFFECTIVITY

Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6.

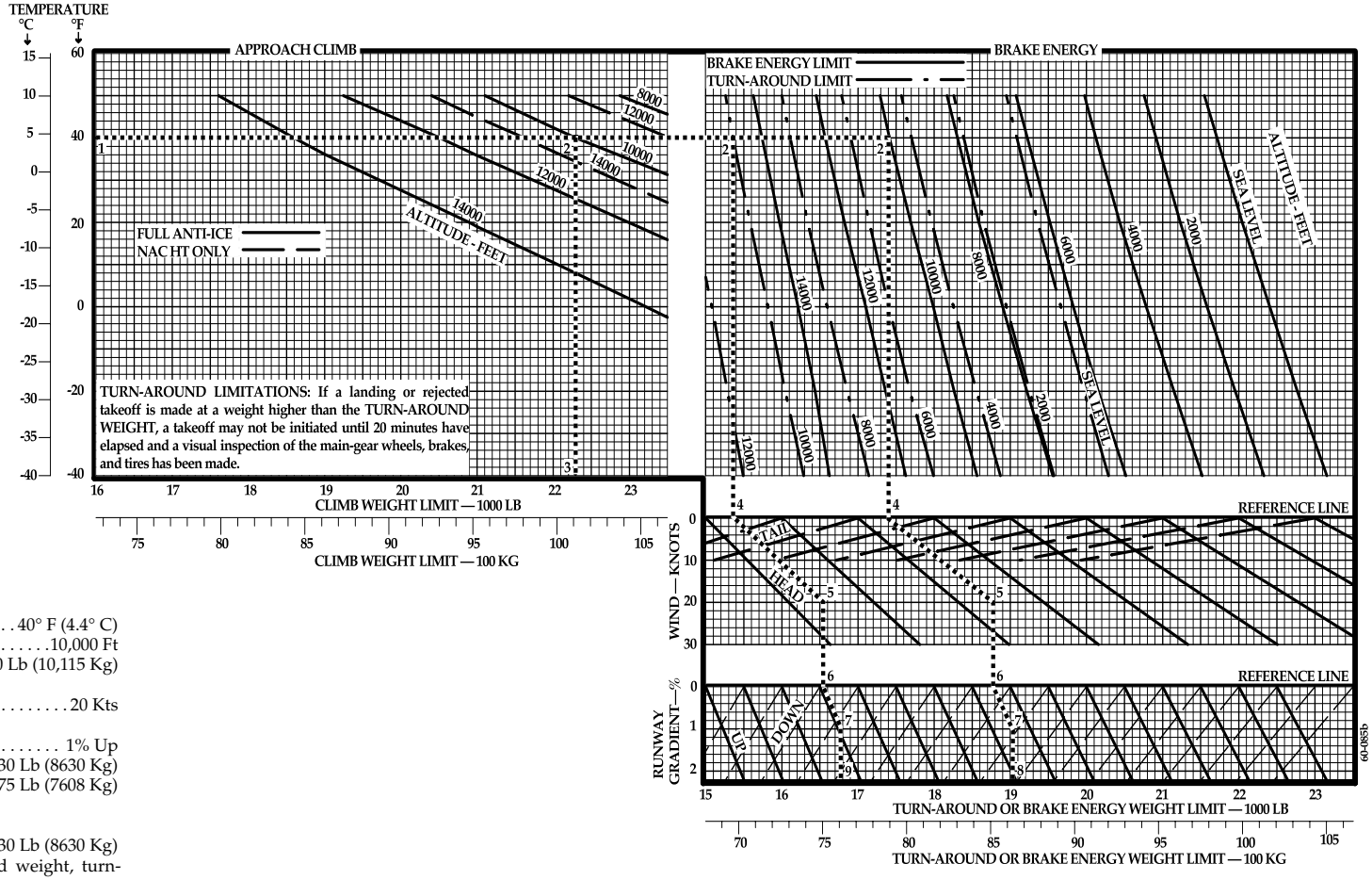
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Figure 5-73

LANDING WEIGHT LIMIT
ANTI-ICE — ON
AUTOSPOILERS

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6



EXAMPLE:

1. Temperature . . . . . 40° F (4.4° C)
2. Altitude (FULL ANTI-ICE) . . . . . 10,000 Ft
3. Climb Weight Limit . . . . . 22,300 Lb (10,115 Kg)
4. Reference Line
5. Headwind . . . . . 20 Kts
6. Reference Line
7. Runway Gradient . . . . . 1% Up
8. Brake Energy Weight Limit . . . . . 19,030 Lb (8630 Kg)
9. Turn-Around Weight Limit . . . . . 16,775 Lb (7608 Kg)

The most limiting condition is Brake Energy

- Landing Weight Limit . . . . . 19,030 Lb (8630 Kg)
- If landing is made above the turn-around weight, turn-around limitations must be observed.

NOTE: The value obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, and the landing weight for the runway length available.

Figure 5-73.1

EFFECTIVITY

Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6

UNCORRECTED LANDING DISTANCE — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		2980	3020	3060	3090	3130	3170	3200	3230	3250	3280	3310	3330		
	16,000		3070	3120	3160	3200	3240	3290	3320	3340	3370	3400	3430	3460		
	17,000		3160	3210	3250	3300	3350	3390	3430	3460	3500	3530	3570	3600		
	18,000		3240	3290	3340	3400	3460	3520	3550	3590	3630	3670	3700	3740		
	19,000		3330	3390	3450	3520	3580	3650	3690	3730	3770	3810	3850	3890		
	19,500		3370	3440	3510	3580	3640	3710	3760	3800	3840	3880	3920	3970		
	20,000		3430	3500	3570	3640	3710	3780	3820	3870	3910	3950	4000	4040		
	21,000		3530	3610	3680	3760	3840	3920	3970	4010	4060	4110	4150	4200		
	22,000		3640	3730	3810	3890	3980	4060	4110	4160	4210	4270	4320	4370		
	23,000		3760	3850	3940	4030	4120	4210	4270	4320	4380	4440	4490	4550		
	23,100		3770	3860	3950	4040	4130	4230	4280	4340	4400	4450	4510	4570		
1,000	15,000		3020	3060	3100	3140	3180	3230	3250	3280	3310	3340	3360	3390		
	16,000		3120	3160	3210	3250	3300	3340	3370	3400	3430	3460	3490	3520		
	17,000		3210	3260	3310	3360	3400	3460	3500	3530	3570	3600	3640	3680		
	18,000		3290	3350	3400	3460	3530	3590	3630	3670	3710	3750	3790	3830		
	19,000		3380	3450	3520	3590	3660	3730	3770	3810	3850	3900	3940	3980		
	19,500		3440	3510	3580	3650	3720	3800	3840	3880	3930	3970	4020	4060		
	20,000		3490	3570	3640	3710	3790	3870	3910	3960	4000	4050	4090	4140		
	21,000		3600	3680	3760	3850	3930	4010	4060	4110	4160	4210	4260	4310		
	22,000		3720	3800	3890	3980	4070	4160	4210	4270	4320	4380	4430	4490		
	23,000		3840	3930	4030	4120	4220	4320	4380	4440	4500	4560	4620	4680		
	23,100		3850	3940	4040	4140	4240	4340	4400	4450	4510	4570	4630	4700		
2,000	15,000		3070	3110	3150	3200	3240	3280	3310	3340	3370	3400	3420	3450		
	16,000		3170	3210	3260	3310	3350	3400	3430	3460	3490	3530	3560	3600		
	17,000		3260	3310	3360	3410	3470	3530	3570	3610	3640	3680	3720	3760		
	18,000		3350	3400	3470	3530	3600	3670	3710	3750	3790	3830	3870	3910		
	19,000		3450	3520	3590	3660	3740	3810	3850	3900	3940	3990	4030	4080		
	19,500		3500	3580	3650	3730	3800	3880	3930	3970	4020	4070	4110	4160		
	20,000		3560	3640	3720	3800	3870	3960	4000	4050	4100	4150	4200	4250		
	21,000		3680	3760	3850	3930	4020	4110	4160	4210	4260	4320	4370	4420		
	22,000		3800	3890	3980	4080	4170	4270	4320	4380	4440	4490	4550	4610		
	23,000		3920	4020	4120	4230	4330	4440	4500	4560	4620	4680	4750	4810		
	23,100		3940	4040	4140	4240	4340	4450	4510	4580	4640	4700	4770	4830		
3,000	15,000		3110	3160	3200	3250	3290	3340	3370	3400	3430	3460	3490	3520		
	16,000		3220	3270	3310	3360	3410	3460	3500	3530	3570	3600	3640	3680		
	17,000		3310	3370	3420	3480	3540	3610	3650	3680	3720	3760	3800	3840		
	18,000		3400	3470	3540	3610	3680	3750	3790	3830	3880	3920	3960	4010		
	19,000		3520	3590	3670	3740	3820	3900	3940	3990	4040	4080	4130	4180		
	19,500		3570	3650	3730	3810	3890	3970	4020	4070	4120	4170	4220	4270		
	20,000		3630	3720	3800	3880	3970	4050	4100	4150	4200	4250	4300	4360		
	21,000		3760	3840	3930	4030	4120	4210	4270	4320	4380	4430	4490	4540		
	22,000		3880	3980	4080	4180	4280	4380	4440	4500	4560	4620	4680	4740		
	23,000		4010	4120	4230	4340	4450	4560	4620	4690	4760	4820	4890	4960		
	23,100		4030	4130	4240	4350	4460	4580	4640	4710	4780	4840	4910	4980		
4,000	15,000		3160	3210	3260	3300	3350	3400	3430	3460	3490	3520	3550			
	16,000		3270	3320	3370	3420	3470	3530	3570	3610	3640	3680	3720			
	17,000		3370	3420	3480	3550	3620	3680	3730	3770	3810	3850	3890			
	18,000		3470	3540	3610	3690	3760	3830	3880	3920	3970	4010	4060			
	19,000		3590	3670	3750	3830	3910	3990	4040	4090	4140	4190	4240			
	19,500		3650	3730	3810	3900	3980	4070	4120	4170	4220	4270	4330			
	20,000		3710	3800	3880	3970	4060	4150	4200	4260	4310	4370	4420			
	21,000		3840	3930	4030	4120	4220	4320	4380	4440	4500	4550	4610			
	22,000		3970	4070	4180	4280	4390	4500	4560	4630	4690	4760	4820			
	23,000		4110	4220	4330	4450	4570	4690	4760	4830	4900	4970	5040			
	23,100		4120	4240	4350	4470	4590	4710	4780	4850	4920	4990	5070			
5,000	15,000		3230	3280	3330	3380	3420	3470	3500	3530	3560	3590	3630			
	16,000		3340	3390	3440	3500	3560	3620	3660	3690	3730	3770	3810			
	17,000		3440	3500	3570	3640	3710	3780	3820	3860	3900	3950	3990			
	18,000		3550	3630	3700	3780	3860	3940	3980	4030	4070	4120	4170			
	19,000		3680	3760	3840	3930	4010	4100	4150	4200	4250	4300	4350			
	19,500		3740	3830	3920	4010	4090	4190	4240	4290	4340	4400	4450			
	20,000		3810	3900	3990	4080	4180	4270	4330	4380	4440	4490	4550			
	21,000		3940	4040	4140	4240	4350	4450	4510	4570	4630	4690	4760			
	22,000		4080	4190	4300	4410	4530	4640	4710	4770	4840	4910	4980			
	23,000		4230	4350	4470	4590	4720	4850	4920	4990	5070	5140	5220			
	23,100		4240	4360	4480	4610	4740	4870	4940	5010	5090	5170	5240			
6,000	15,000		3290	3350	3400	3450	3500	3550	3570	3600	3640	3680				
	16,000		3400	3460	3520	3580	3640	3710	3750	3780	3820	3860				
	17,000		3510	3580	3660	3730	3800	3880	3920	3960	4000	4050				
	18,000		3640	3720	3800	3880	3960	4050	4090	4130	4180	4230				
	19,000		3770	3860	3950	4040	4130	4220	4270	4320	4370	4420				
	19,500		3840	3930	4020	4120	4210	4310	4360	4410	4470	4520				
	20,000		3900	4000	4100	4200	4300	4400	4450	4510	4570	4620				
	21,000		4050	4150	4260	4370	4480	4590	4650	4710	4770	4840				
	22,000		4190	4310	4430	4550	4670	4790	4860	4930	5000	5070				
	23,000		4350	4480	4610	4740	4870	5010	5090	5160	5240	5320				
	23,100		4370	4500	4620	4760	4890	5040	5110	5180	5270	5350				

ABOVE LIMITS

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7,000	15,000		3370	3420	3480	3530	3580	3640	3670	3700	3740	3780			
	16,000		3480	3540	3600	3680	3750	3820	3850	3890	3930	3970			
	17,000		3600	3680	3760	3840	3920	4000	4040	4080	4120	4170			
	18,000		3730	3820	3910	4000	4080	4170	4220	4260	4310	4360			
	19,000		3870	3970	4060	4160	4260	4360	4410	4460	4510	4560			
	19,500		3940	4040	4140	4240	4350	4450	4500	4560	4610	4670			
	20,000		4020	4120	4230	4330	4440	4550	4600	4660	4720	4780			
	21,000		4170	4280	4400	4510	4630	4750	4820	4880	4950	5010			
	22,000		4330	4450	4580	4710	4840	4970	5040	5120	5190	5260			
	23,000		4490	4630	4770	4910	5060	5210	5290	5370	5450	5540			
	23,100		4510	4650	4790	4930	5080	5240	5310	5400	5480	5570			
8,000	15,000		3430	3490	3550	3610	3670	3730	3770	3800	3840	3870			
	16,000		3550	3620	3690	3770	3850	3920	3960	4000	4040	4080			
	17,000		3690	3770	3850	3940	4020	4110	4150	4200	4240	4280			
	18,000		3830	3920	4010	4110	4200	4300	4340	4390	4440	4490			
	19,000		3970	4070	4180	4280	4380	4490	4540	4600	4650	4700			
	19,500		4050	4150	4260	4370	4480	4590	4650	4700	4760	4820			
	20,000		4130	4240	4350	4460	4580	4700	4750	4810	4870	4940			
	21,000		4290	4410	4530	4660	4780	4910	4980	5050	5120	5180			
	22,000		4450	4590	4720	4850	5000	5150	5230	5300	5380	5460			
	23,000		4630	4780	4930	5080	5240	5410	5490	5580	5660	5750			
	23,100		4650	4800	4950	5110	5270	5430	5520	5610	5690	5780			
9,000	15,000		3520	3580	3640	3700	3780	3850	3880	3920	3960				
	16,000		3640	3720	3800	3880	3970	4050	4090	4130	4170				
	17,000		3800	3880	3970	4060	4160	4250	4290	4340	4380				
	18,000		3950	4040	4140	4240	4340	4440	4490	4550	4600				
	19,000		4100	4210	4310	4430	4540	4650	4710	4770	4820				
	19,500		4180	4290	4410	4520	4640	4760	4820	4880	4940				
	20,000		4260	4380	4500	4620	4750	4870	4940	5000	5070				
	21,000		4440	4560	4700	4830	4970	5110	5180	5260	5330				
	22,000		4620	4760	4900	5050	5210	5370	5450	5530	5620				
	23,000		4810	4970	5130	5300	5470	5650	5740	5840	5930				
	23,100		4830	4990	5150	5320	5500	5680	5770	5870	5970				
10,000	15,000		3600	3660	3720	3800	3880	3950	3990	4030	4070				
	16,000		3740	3820	3900	3990	4080	4160	4200	4250	4290				
	17,000		3900	3990	4080	4180	4280	4370	4420	4470	4520				
	18,000		4060	4160	4260	4370	4470	4580	4640	4690	4750				
	19,000		4220	4330	4440	4560	4680	4800	4860	4930	4990				
	19,500		4310	4420	4540	4670	4790	4920	4980	5050	5120				
	20,000		4390	4520	4640	4770	4910	5040	5110	5180	5250				
	21,000		4580	4710	4850	5000	5150	5300	5370	5450	5530				
	22,000		4770	4920	5070	5240	5410	5580	5660	5750	5850				
	23,000		4980	5140	5320	5500	5690	5880	5980	6090	6190				
	23,100		5000	5170	5340	5530	5720	5920	6020	6120	6230				
12,000	15,000		3780	3860	3940	4030	4120	4210	4250	4290					
	16,000		3960	4050	4140	4240	4340	4440	4490	4540					
	17,000		4150	4240	4350	4460	4570	4680	4740	4800					
	18,000		4320	4430	4550	4670	4800	4920	4990	5050					
	19,000		4510	4630	4760	4900	5040	5180	5250	5330					
	19,500		4610	4740	4880	5020	5170	5320	5400	5480					
	20,000		4710	4850	4990	5150	5300	5460	5550	5630					
	21,000		4920	5070	5240	5410	5590	5770	5860	5960					
	22,000		5150	5320	5500	5700	5900	6110	6220	6330					
	23,000		5400	5590	5800	6020	6250	6490	6620	6740					
	23,100		5420	5620	5830	6050	6290	6530	6660	6790					
14,000	15,000		4040	4120	4220	4310	4410	4520	4570	4620					
	16,000		4250	4340	4450	4560	4670	4790	4850	4910					
	17,000		4460	4560	4680	4810	4940	5070	5140	5210					
	18,000		4670	4780	4920	5060	5200	5360	5430	5510					
	19,000		4890	5020	5170	5330	5500	5670	5760	5850					
	19,500		5000	5140	5300	5470	5650	5840	5930	6020					
	20,000		5120	5280	5440	5630	5810	6010	6110	6220					
	21,000		5380	5550	5740	5950	6170	6400	6510	6630					
	22,000		5650	5850	6070	6310	6560	6820	6960	7100					
	23,000		5960	6190	6440	6710	7000	7320	7480	7640					
	23,100		5990	6220	6480	6760	7050	7370	7540	7710					

ABOVE LIMITS

NOTE: This table was prepared for zero wind, zero runway gradient & anti-skid on. For conditions other than these, apply the result from this table to the correction chart in Figure 5-75.

Figures in shaded area are provided for interpolation only.

Figure 5-74

ACTUAL LANDING DISTANCE
AUTOSPOILERS

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6

UNCORRECTED LANDING DISTANCE — FT

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45	50
		°F	-40	-20	0	20	40	60	70	80	90	100	110	120		
SEA LEVEL	15,000		2610	2640	2670	2710	2740	2770	2800	2820	2850	2880	2910	2940		
	16,000		2700	2730	2770	2810	2860	2910	2940	2970	3010	3040	3070	3110		
	17,000		2780	2830	2880	2940	2990	3050	3090	3120	3160	3200	3230	3270		
	18,000		2890	2950	3000	3070	3130	3190	3230	3270	3310	3350	3400	3440		
	19,000		3000	3070	3130	3200	3270	3340	3390	3430	3480	3520	3570	3610		
	19,500		3060	3130	3200	3270	3340	3420	3470	3520	3560	3610	3660	3710		
	20,000		**3120**	**3190**	**3260**	**3340**	**3420**	**3500**	**3550**	**3600**	**3650**	**3700**	**3750**	**3800**		
	21,000		**3240**	**3320**	**3400**	**3490**	**3580**	**3670**	**3730**	**3780**	**3840**	**3890**	**3950**	**4010**		
	22,000		**3370**	**3460**	**3550**	**3650**	**3750**	**3850**	**3910**	**3970**	**4030**	**4100**	**4160**	**4220**		
	23,000		**3510**	**3610**	**3710**	**3820**	**3930**	**4050**	**4110**	**4180**	**4250**	**4320**	**4390**	**4470**		
	23,500		**3580**	**3680**	**3790**	**3910**	**4020**	**4150**	**4220**	**4290**	**4370**	**4440**	**4520**	**4590**		
1,000	15,000		2650	2680	2720	2750	2790	2820	2850	2880	2920	2950	2980	**3010**		
	16,000		2740	2780	2820	2870	2920	2970	3010	3040	3080	3110	3150	**3180**		
	17,000		2830	2890	2950	3000	3060	3120	3160	3200	3240	3280	3320	**3360**		
	18,000		2950	3010	3070	3140	3200	3270	3320	3360	3400	3440	3490	**3530**		
	19,000		3070	3130	3210	3280	3350	3430	3480	3530	3570	3620	3670	**3720**		
	19,500		3130	3200	3270	3350	3430	3510	3560	3610	3660	3720	3770	**3820**		
	20,000		**3190**	**3270**	**3350**	**3430**	**3510**	**3600**	**3650**	**3700**	**3760**	**3810**	**3870**	**3920**		
	21,000		**3320**	**3400**	**3490**	**3590**	**3680**	**3780**	**3840**	**3900**	**3960**	**4020**	**4080**	**4140**		
	22,000		**3450**	**3550**	**3650**	**3750**	**3860**	**3970**	**4040**	**4100**	**4170**	**4240**	**4300**	**4370**		
	23,000		**3600**	**3710**	**3820**	**3940**	**4060**	**4180**	**4250**	**4330**	**4400**	**4480**	**4560**	**4630**		
	23,500		**3680**	**3790**	**3910**	**4030**	**4160**	**4290**	**4370**	**4450**	**4530**	**4610**	**4690**	**4770**		
2,000	15,000		2690	2730	2760	2800	2840	2880	2920	2950	2980	3020	3050	**3080**		
	16,000		2780	2820	2880	2930	2990	3040	3080	3110	3150	3190	3230	**3260**		
	17,000		2890	2950	3010	3070	3130	3200	3240	3280	3320	3360	3400	**3450**		
	18,000		3010	3080	3140	3210	3280	3360	3400	3450	3490	3540	3590	**3630**		
	19,000		3130	3210	3290	3360	3440	3530	3580	3630	3680	3730	3780	**3830**		
	19,500		3200	3280	3360	3440	3530	3610	3670	3720	3770	3830	3880	**3940**		
	20,000		**3260**	**3350**	**3430**	**3520**	**3610**	**3700**	**3760**	**3820**	**3870**	**3930**	**3990**	**4050**		
	21,000		**3400**	**3490**	**3590**	**3690**	**3790**	**3900**	**3960**	**4020**	**4080**	**4150**	**4210**	**4280**		
	22,000		**3550**	**3650**	**3760**	**3870**	**3980**	**4100**	**4170**	**4240**	**4310**	**4380**	**4460**	**4530**		
	23,000		**3700**	**3820**	**3940**	**4060**	**4190**	**4330**	**4400**	**4480**	**4570**	**4650**	**4730**	**4820**		
	23,500		**3780**	**3900**	**4030**	**4160**	**4300**	**4450**	**4530**	**4610**	**4700**	**4790**	**4880**	**4970**		
3,000	15,000		2730	2770	2810	2850	2900	2950	2980	3020	3050	3090	3120	**3160**		
	16,000		2830	2880	2940	3000	3060	3120	3150	3190	3230	3270	3310	**3350**		
	17,000		2950	3020	3080	3150	3210	3280	3320	3370	3410	3450	3500	**3540**		
	18,000		3080	3150	3220	3300	3370	3450	3500	3540	3590	3640	3690	**3740**		
	19,000		3210	3290	3370	3450	3540	3630	3680	3730	3790	3840	3900	**3950**		
	19,500		3280	3360	3450	3540	3630	3720	3780	3830	3890	3950	4010	**4060**		
	20,000		**3340**	**3430**	**3530**	**3620**	**3720**	**3820**	**3880**	**3940**	**4000**	**4060**	**4120**	**4180**		
	21,000		**3490**	**3590**	**3690**	**3800**	**3910**	**4020**	**4090**	**4150**	**4220**	**4290**	**4360**	**4430**		
	22,000		**3640**	**3750**	**3870**	**3990**	**4110**	**4240**	**4320**	**4390**	**4470**	**4550**	**4630**	**4710**		
	23,000		**3810**	**3930**	**4060**	**4200**	**4340**	**4490**	**4570**	**4660**	**4740**	**4830**	**4920**	**5010**		
	23,500		**3890**	**4020**	**4160**	**4310**	**4460**	**4620**	**4700**	**4800**	**4890**	**4980**	**5080**	**5180**		
4,000	15,000		2780	2820	2860	2910	2960	3020	3060	3090	3130	3160	**3200**			
	16,000		2890	2940	3000	3070	3130	3190	3230	3270	3320	3360	**3400**			
	17,000		3020	3080	3150	3220	3300	3370	3410	3460	3510	3550	**3600**			
	18,000		3150	3220	3300	3380	3460	3550	3600	3650	3700	3750	**3800**			
	19,000		3290	3370	3460	3550	3640	3740	3790	3850	3910	3960	**4020**			
	19,500		3360	3450	3540	3640	3730	3830	3890	3950	4020	4080	**4140**			
	20,000		**3430**	**3520**	**3620**	**3730**	**3830**	**3940**	**4000**	**4060**	**4130**	**4190**	**4260**			
	21,000		**3580**	**3690**	**3800**	**3920**	**4040**	**4160**	**4230**	**4300**	**4370**	**4450**	**4520**			
	22,000		**3750**	**3870**	**3990**	**4120**	**4260**	**4390**	**4480**	**4560**	**4640**	**4720**	**4810**			
	23,000		**3920**	**4060**	**4200**	**4350**	**4500**	**4660**	**4750**	**4840**	**4940**	**5030**	**5130**			
	23,500		**4020**	**4160**	**4310**	**4470**	**4630**	**4800**	**4900**	**5000**	**5100**	**5200**	**5310**			
5,000	15,000		2840	2890	2940	2990	3050	3110	3140	3180	3220	3250	**3290**			
	16,000		2960	3030	3090	3160	3220	3290	3330	3370	3410	3460	**3500**			
	17,000		3100	3180	3250	3320	3400	3480	3520	3570	3620	3660	**3710**			
	18,000		3240	3320	3400	3490	3580	3670	3720	3770	3820	3880	**3930**			
	19,000		3390	3480	3570	3670	3770	3870	3920	3980	4040	4110	**4170**			
	19,500		3460	3560	3660	3760	3870	3980	4030	4100	4160	4230	**4290**			
	20,000		**3540**	**3640**	**3750**	**3860**	**3970**	**4090**	**4150**	**4220**	**4280**	**4350**	**4420**			
	21,000		**3700**	**3820**	**3940**	**4060**	**4190**	**4320**	**4390**	**4470**	**4550**	**4630**	**4710**			
	22,000		**3880**	**4010**	**4140**	**4280**	**4430**	**4580**	**4660**	**4750**	**4840**	**4930**	**5020**			
	23,000		**4070**	**4220**	**4370**	**4530**	**4690**	**4870**	**4960**	**5060**	**5170**	**5270**	**5380**			
	23,500		**4170**	**4320**	**4490**	**4660**	**4830**	**5020**	**5130**	**5230**	**5340**	**5460**	**5570**			
6,000	15,000		2910	2960	3020	3080	3140	3200	3230	3270	3310	3340				
	16,000		3050	3110	3180	3250	3320	3390	3430	3470	3520	3560				
	17,000		3190	3270	3350	3430	3510	3590	3630	3680	3730	3780				
	18,000		3340	3430	3510	3600	3690	3790	3840	3890	3950	4010				
	19,000		3490	3590	3690	3790	3900	4010	4060	4120	4190	4250				
	19,500		3570	3680	3780	3890	4000	4120	4180	4250	4320	4390				
	20,000		**3660**	**3770**	**3880**	**4000**	**4110**	**4240**	**4310**	**4380**	**4450**	**4520**				
	21,000		**3830**	**3960**	**4080**	**4210**	**4350**	**4500**	**4570**	**4650**	**4730**	**4820**				
	22,000		**4020**	**4160**	**4300**	**4450**	**4610**	**4780**	**4860**	**4960**	**5050**	**5150**				
	23,000		**4230**	**4390**	**4550**	**4720**	**4900**	**5090**	**5190**	**5300**	**5410**	**5530**				
	23,500		**4330**	**4500**	**4680**	**4860**	**5060**	**5260**	**5370**	**5490**	**5610**	**5730**				

ABOVE LIMITS

Figures in shaded area are provided for interpolation only.

ALTITUDE FEET	WEIGHT LB	TEMPERATURE °C	-40	-30	-20	-10	0	10	15	20	25	30	35	40	45
		°F	-40	-20	0	20	40	60	70	80	90	100	110		
7,000	15,000		2980	3050	3110	3170	3240	3310	3340	3380	**3410**	**3450**			
	16,000		3140	3210	3280	3360	3430	3510	3550	3600	**3640**	**3680**			
	17,000		3290	3380	3460	3550	3630	3720	3770	3820	**3870**	**3920**			
	18,000		3450	3540	3640	3730	3830	3940	3990	4050	**4110**	**4160**			
	19,000		3610	3720	3830	3940	4050	4170	4240	4300	**4360**	**4430**			
	19,500		3700	3810	3930	4050	4170	4300	4360	4430	**4500**	**4570**			
	20,000		**3790**	**3910**	**4030**	**4160**	**4290**	**4430**	**4500**	**4570**	**4650**	**4720**			
	21,000		**3980**	**4110**	**4250**	**4400**	**4550**	**4710**	**4790**	**4870**	**4960**	**5050**			
	22,000		**4180**	**4340**	**4490**	**4660**	**4830**	**5020**	**5110**	**5210**	**5320**	**5420**			
	23,000		**4410**	**4580**	**4760**	**4950**	**5150**	**5370**	**5480**	**5590**	**5710**	**5840**			
	23,500		**4520**	**4710**	**4900**	**5110**	**5320**	**5560**	**5680**	**5800**	**5930**	**6070**			
8,000	15,000		3060	3130	3200	3270	3340	3410	3450	3490	**3520**	**3560**			
	16,000		3230	3300	3380	3470	3550	3630	3670	3720	**3760**	**3800**			
	17,000		3390	3480	3570	3660	3760	3860	3910	3960	**4010**	**4060**			
	18,000		3560	3660	3760	3870	3970	4090	4140	4200	**4260**	**4320**			
	19,000		3730	3850	3960	4090	4210	4340	4410	4470	**4540**	**4610**			
	19,500		3830	3950	4070	4200	4330	4470	4540	4620	**4690**	**4760**			
	20,000		**3920**	**4050**	**4180**	**4320**	**4460**	**4610**	**4690**	**4770**	**4850**	**4930**			
	21,000		**4120**	**4270**	**4420**	**4580**	**4740**	**4920**	**5010**	**5100**	**5190**	**5280**			
	22,000		**4350**	**4510**	**4680**	**4870**	**5060**	**5260**	**5370**	**5470**	**5580**	**5690**			
	23,000		**4590**	**4780**	**4970**	**5190**	**5410**	**5640**	**5770**	**5890**	**6020**	**6160**			
	23,500		**4720**	**4920**	**5130**	**5360**	**5600**	**5860**	**5990**	**6130**	**6270**	**6420**			
9,000	15,000		3160	3240	3310	3380	3460	3540	3580	**3620**	**3660**				
	16,000		3340	3420	3500	3590	3680	3770	3820	**3870**	**3910**				
	17,000		3520	3610	3710	3810	3910	4020	4070	**4120**	**4180**				
	18,000		3690	3800	3910	4030	4140	4270	4330	**4390**	**4460**				
	19,000		3880	4010	4130	4260	4400	4540	4610	**4690**	**4760**				
	19,500		3980	4110	4250	4390	4540	4690	4770	**4850**	**4930**				
	20,000		**4090**	**4230**	**4370**	**4520**	**4680**	**4840**	**4930**	**5010**	**5100**				
	21,000		**4310**	**4470**	**4630**	**4810**	**4990**	**5180**	**5280**	**5380**	**5490**				
	22,000		**4560**	**4740**	**4920**	**5130**	**5340**	**5560**	**5680**	**5800**	**5920**				
	23,000		**4820**	**5030**	**5250**	**5480**	**5730**	**6000**	**6130**	**6280**	**6430**				
	23,500		**4970**	**5190**	**5430**	**5680**	**5950**	**6240**	**6390**	**6550**	**6710**				
10,000	15,000		3260	3330	3410	3490	3580	3660	3700	**3740**	**3780**				
	16,000		3450	3530	3620	3710	3810	3910	3950	**4010**	**4060**				
	17,000		3630	3730	3830	3940	4050	4170	4220	**4280**	**4340**				
	18,000		3820	3940	4050	4180	4310	4430	4500	**4570**	**4640**				
	19,000		4030	4160	4290	4430	4580	4730	4810	**4890**	**4970**				
	19,500		4140	4280	4420	4570	4730	4890	4980	**5060**	**5150**				
	20,000		**4250**	**4400**	**4550**	**4710**	**4890**	**5060**	**5150**	**5250**	**5340**				
	21,000		**4490**	**4660**	**4840**	**5030**	**5230**	**5440**	**5540**	**5650**	**5770**				
	22,000		**4760**	**4950**	**5160**	**5380**	**5610**	**5860**	**5980**	**6120**	**6260**				
	23,000		**5050**	**5280**	**5510**	**5770**	**6050**	**6340**	**6490**	**6660**	**6820**				
	23,500		**5210**	**5460**	**5710**	**5990**	**6300**	**6620**	**6780**	**6970**	**7150**				
12,000	15,000		3490	3570	3660	3750	3850	3950	4000	**4050**					
	16,000		3700	3800	3900	4010	4120	4240	4300	**4360**					
	17,000		3920	4030	4150	4280	4410	4540	4610	**4680**					
	18,000		4140	4270	4400	4550	4710	4860	4950	**5030**					
	19,000		4380	4530	4690	4860	5040	5230	5320	**5420**					
	19,500		4510	4670	4840	5030	5220	5420	5530	**5630**					
	20,000		**4650**	**4820**	**5000**	**5210**	**5420**	**5640**	**5750**	**5870**					
	21,000		**4940**	**5140**	**5350**	**5590**	**5840**	**6100**	**6240**	**6380**					
	22,000		**5270**	**5500**	**5760**	**6040**	**6330**	**6650**	**6810**	**6980**					
	23,000		**5630**	**5910**	**6210**	**6550**	**6910**	**7290**	**7490**	**7700**					
	23,500		**5840**	**6140**	**6470**	**6840**	**7230**	**7660**	**7890**	**8130**					
14,000	15,000		3780	3870	3970	4080	4190	4310	4370	**4430**					
	16,000		4030	4130	4250	4380	4520	4660	4730	**4800**					
	17,000		4290	4410	4550	4700	4860	5030	5120	**5200**					
	18,000		4560	4700	4860	5040	5230	5430	5530	**5630**					
	19,000		4860	5020	5210	5420	5650	5880	6000	**6130**					
	19,500		5020	5200	5410	5640	5880	6140	6270	**6410**					
	20,000		**5190**	**5380**	**5610**	**5860**	**6120**	**6410**	**6550**	**6700**					
	21,000		**5560**	**5790**	**6060**	**6360**	**6680**	**7030**	**7210**	**7390**					
	22,000		**5980**	**6260**	**6580**	**6950**	**7340**	**7770**	**7990**	**8230**					
	23,000		**6470**	**6810**	**7200**	**7650**	**8140**	**8680**	**8970**	**9270**					
	23,500		**6740**	**7120**	**7550**	**8050**	**8600**	**9220**	**9550**	**9890**					

ABOVE LIMITS

NOTE: This table was prepared for zero wind, zero runway gradient, anti-skid on & autospoilers deployed. For conditions other than these, apply the result from this table to the correction chart in Figure 5-75.1.

Figure 5-74.1

ACTUAL LANDING DISTANCE CORRECTION CHART

EFFECTIVITY

Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6

EXAMPLE:

1. Uncorrected Landing Distance (from table) ..... 3100 Ft (945 M)
2. Reference Line
3. Headwind ..... 30 Kts
4. Reference Line
5. Runway Gradient ..... 2% UP
6. Reference Line
7. Anti-Skid Systems ..... ON
8. Reference Line
9. Altitude ..... 5000 Ft
10. Corrected Landing Distance ..... 2750 Ft (838 M)

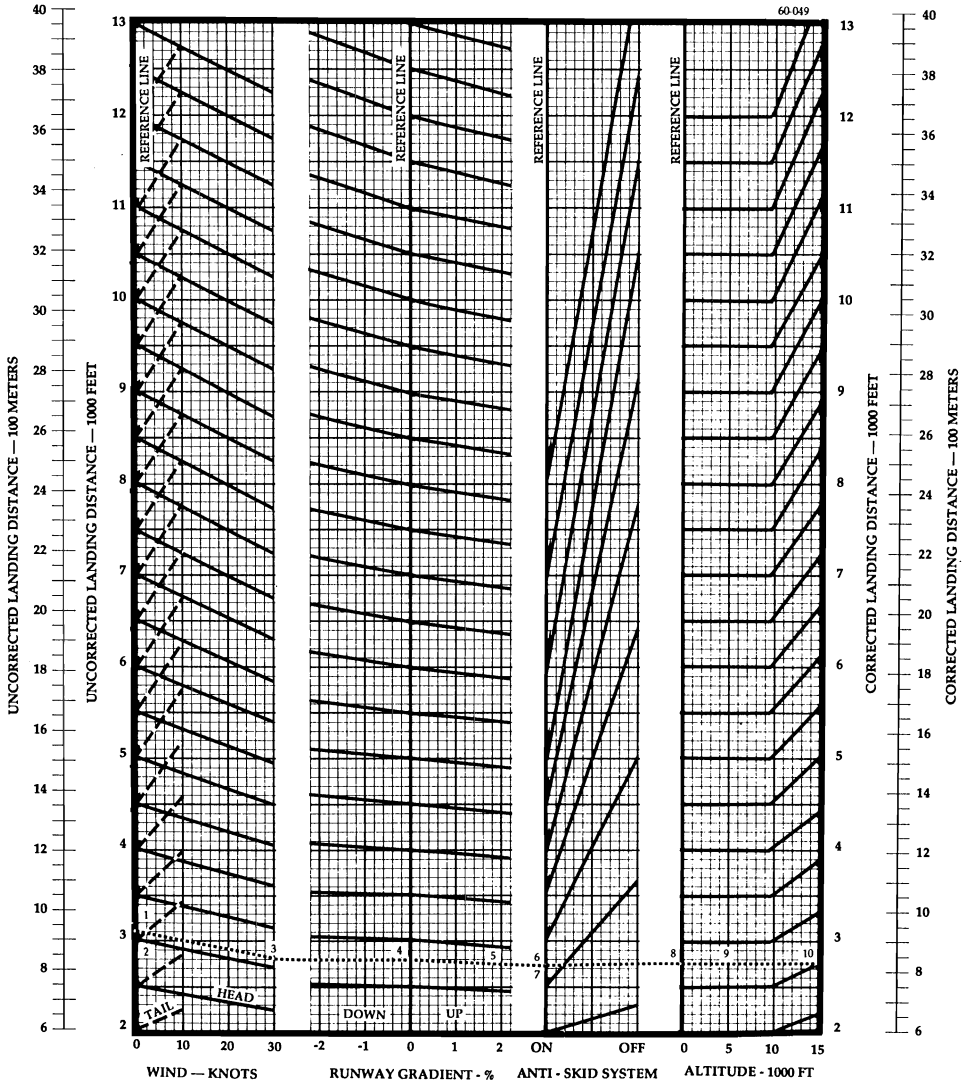


Figure 5-75

ACTUAL LANDING DISTANCE CORRECTION CHART

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6

EXAMPLE:

1. Uncorrected Landing Distance (from table) ..... 3100 Ft (945 M)
2. Reference Line
3. Headwind ..... 20 Kts
4. Reference Line
5. Runway Gradient ..... 2.2% UP
6. Reference Line
7. Anti-Skid Systems ..... ON
8. Reference Line
9. Spoilers ..... AUTO
10. Reference Line
11. Altitude ..... 5000 Ft
12. Corrected Landing Distance ..... 2875 Ft (876 M)

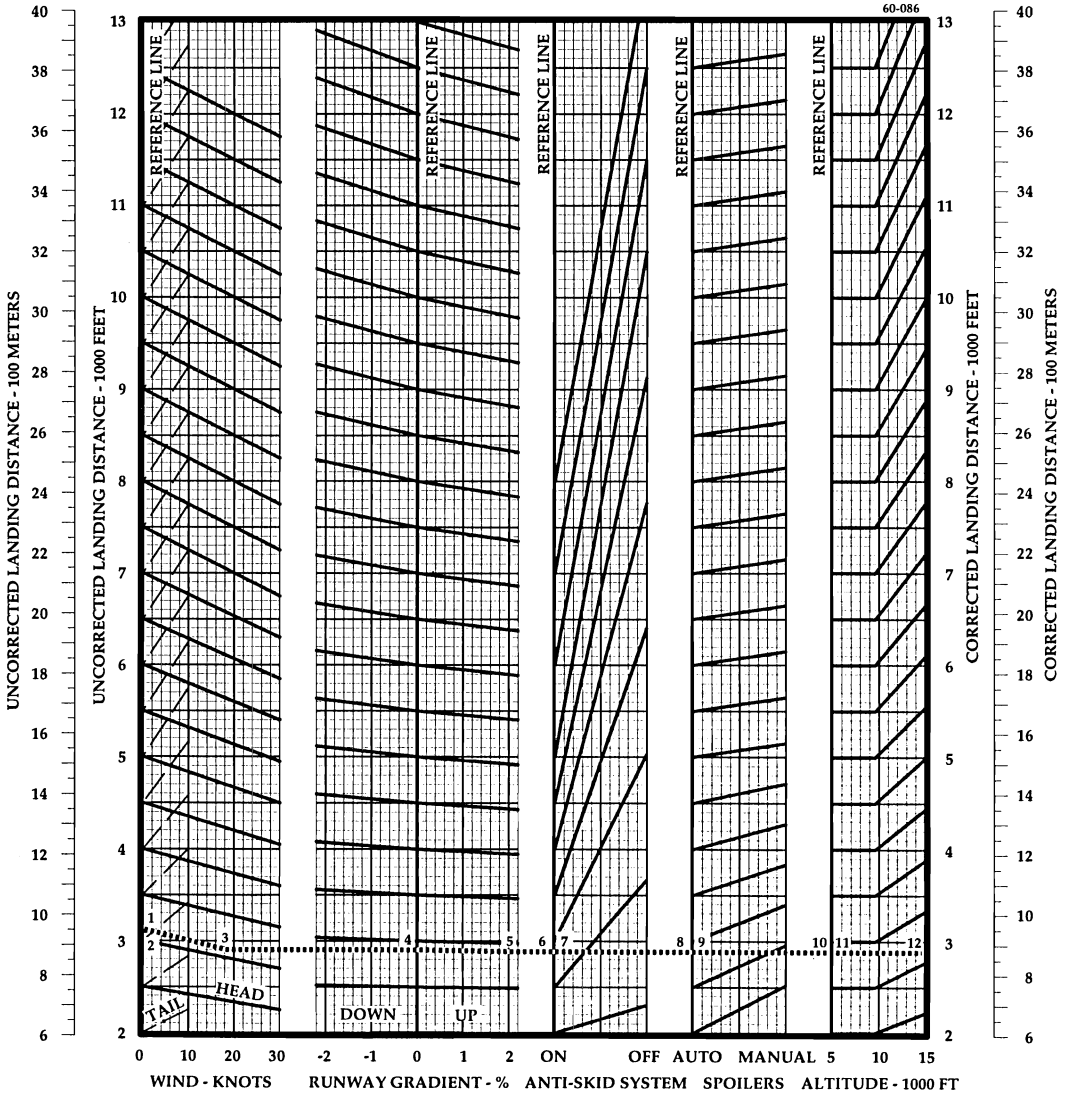


Figure 5-75.1

EFFECTIVITY

Aircraft 60-001 thru 60-093, except 60-079, not incorporating SB 60-27-6.

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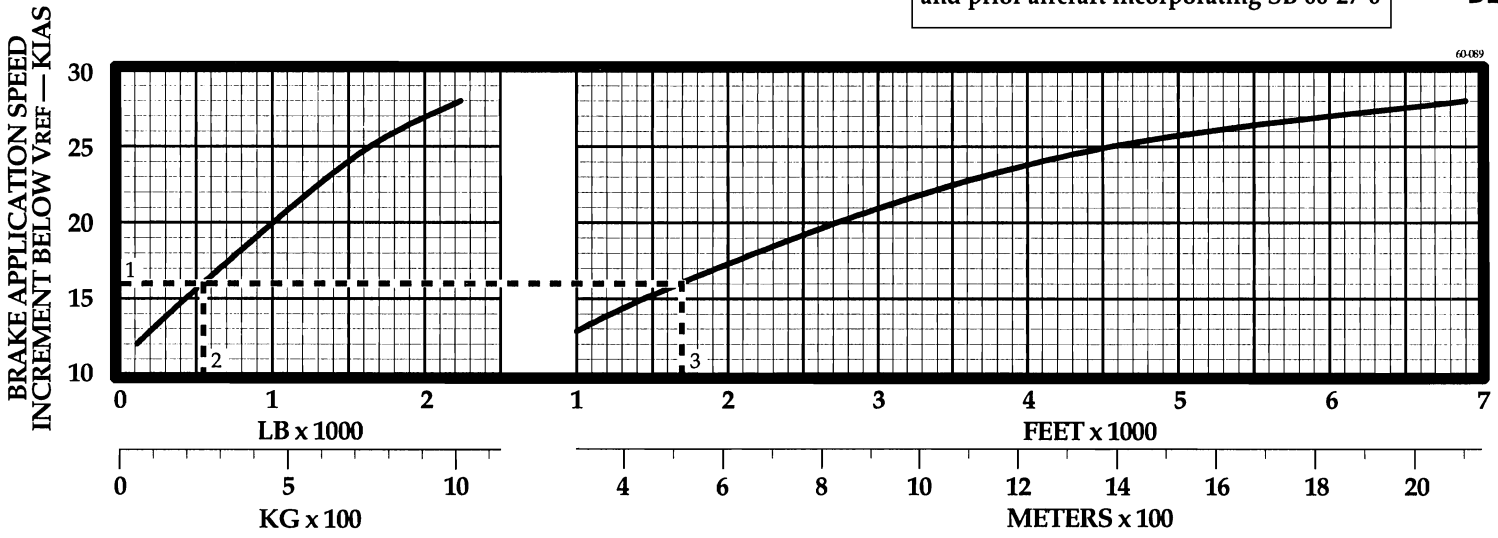
Figure 5-76

EFFECTIVITY

Aircraft 60-079, 60-094 & Subsequent, and prior aircraft incorporating SB 60-27-6

LANDING WEIGHT LIMIT AND ACTUAL LANDING DISTANCE

DELAYED BRAKE APPLICATION AUTOSPOILERS



LANDING BRAKE ENERGY and TURN-AROUND WEIGHT LIMIT INCREASE

LANDING DISTANCE INCREASE

EXAMPLE:

- Landing Weight ..... 19,000 Lb (8,618 Kg)
- VREF ..... 138 KIAS
- Temperature ..... 90° F (32.2° C)
- Altitude ..... 6,000 Ft

Normal Landing Performance

- Actual Landing Distance..... 4,190 Ft (1,277 M)
- Turn-Around Weight Limit..... 16,300 Lb (7,394 Kg)
- Brake Energy Weight Limit..... 18,500 Lb (8,392 Kg)

Landing would **not** be permitted because Landing Weight exceeds Brake Energy Weight Limit.

Landing Performance using Delayed Brake Application

1. Brake Application Speed Increment below VREF..... 16 Knots
2. Landing Brake Energy and Turn-Around Weight Limit Increase ..... 550 Lb (249 Kg)
3. Landing Distance Increase ..... 1,700 Ft (518 M)

- Brake Application Speed..... 122 KIAS
- New Actual Landing Distance..... 5,890 Ft (1,795 M)
- New Turn-Around Weight Limit..... 16,850 Lb (7,643 Kg)
- New Brake Energy Weight Limit..... 19,050 Lb (8,641 Kg)

Landing would be permitted because Landing Weight is less than the New Brake Energy Weight Limit.

NOTE: The brake energy weight limit obtained from this chart may not be the limiting weight. Landing weight is also limited by the maximum certified landing weight, the approach climb weight limit and the landing weight for the runway length available.

REQUIREMENTS:

- Not valid for abnormal landing conditions.
- No tailwind component.
- The anti-skid system must be operational.
- Autospoilers must be used.

Figure 5-76.1

FACTORED LANDING DISTANCE

EFFECTIVITY
All

EXAMPLE:

1. Dry Runway Actual Landing Distance . . . . . 5,000 Ft (1,524 M)
2. Factored Landing Field Length (Dry) . . . . . 8,333 Ft (2,540 M)
3. Factored Landing Field Length (Wet) . . . . . 9,583 Ft (2,921 M)

NOTE:

The Factored Dry Runway Landing Field Length determined from this chart is equal to the Dry Runway Actual Landing Distance divided by 0.60.

The Factored Wet Runway Landing Field Length determined from this chart is equal to the Dry Runway Actual Landing Distance multiplied by 1.92 (factored dry distance x 1.15).

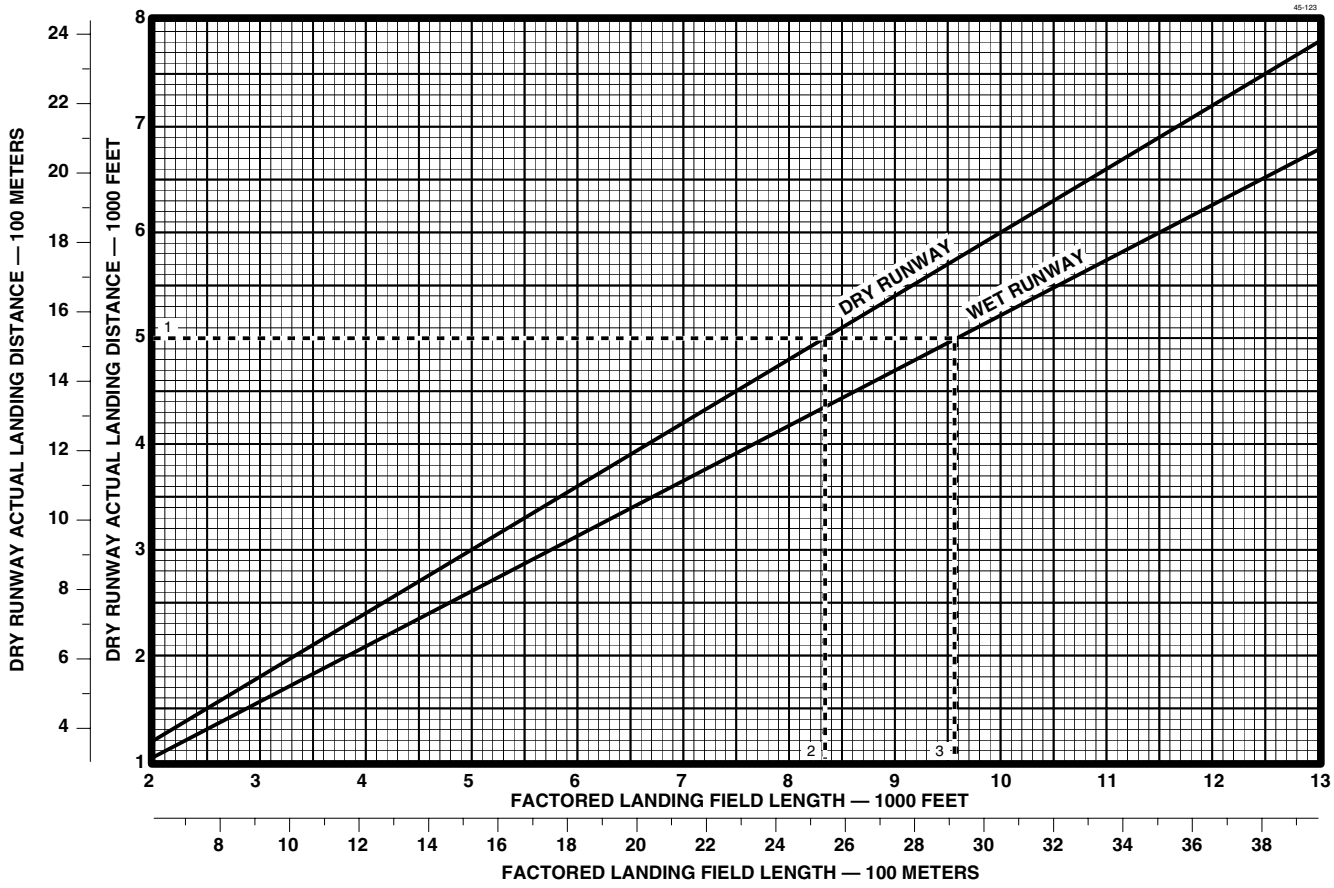


Figure 5-77

SECTION VI — WEIGHT AND BALANCE DATA
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INTRODUCTION

This section contains data and procedures enabling the aircraft operator to maintain weight and balance of the aircraft within the prescribed envelope. It is the responsibility of the operator to ensure that the aircraft is loaded properly. A separate data package, which is specific to a particular aircraft serial number, is provided by the manufacturer at time of initial aircraft delivery. This package includes the aircraft equipment list, the aircraft weighing record, and a payload moments chart. It is the responsibility of the aircraft owner and operator to update this data package when required by aircraft changes.

Owners are advised to contact the aircraft manufacturer when any change is made to the aircraft which would appreciably affect the location of useful load items.

WEIGHT AND CENTER-OF-GRAVITY LIMITS



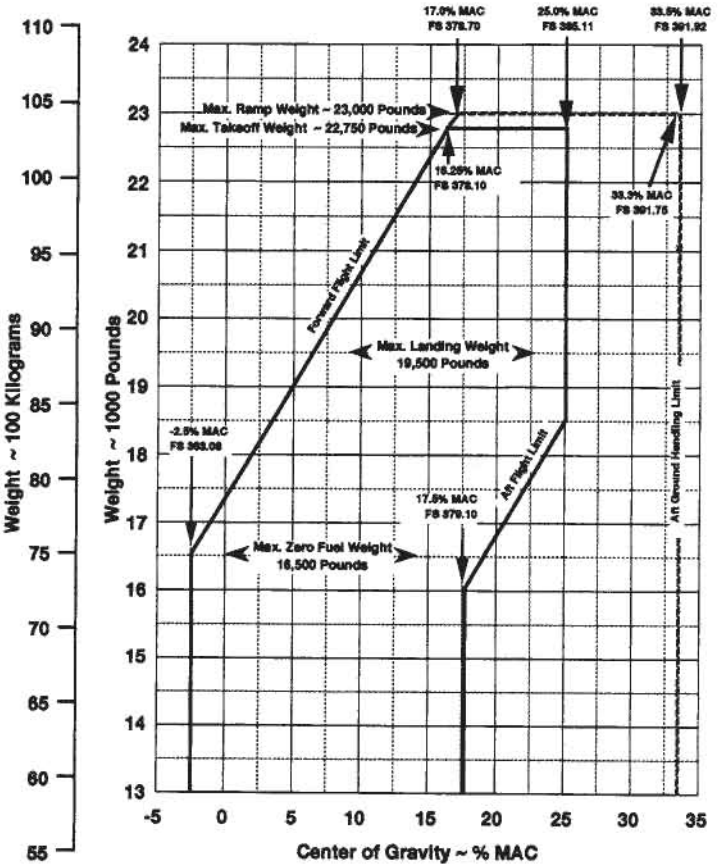
The Normal Empty Weight Center of Gravity may be aft of the Flight Limit.

The center of gravity of the airplane for all flight and ground conditions must be maintained within the applicable CENTER-OF-GRAVITY ENVELOPE defined in Figure 6-1.

CENTER-OF-GRAVITY ENVELOPE

EFFECTIVITY

Aircraft 60-001 thru 60-048 with Standard 22,750 Lb (10,319 kg) Takeoff Weight



Forward Flight Limit — F.S.363.08 (-2.5% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.10 (16.25% MAC) at 22,750 pounds (10,319 kg).

Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 22,750 pounds (10,319 kg).

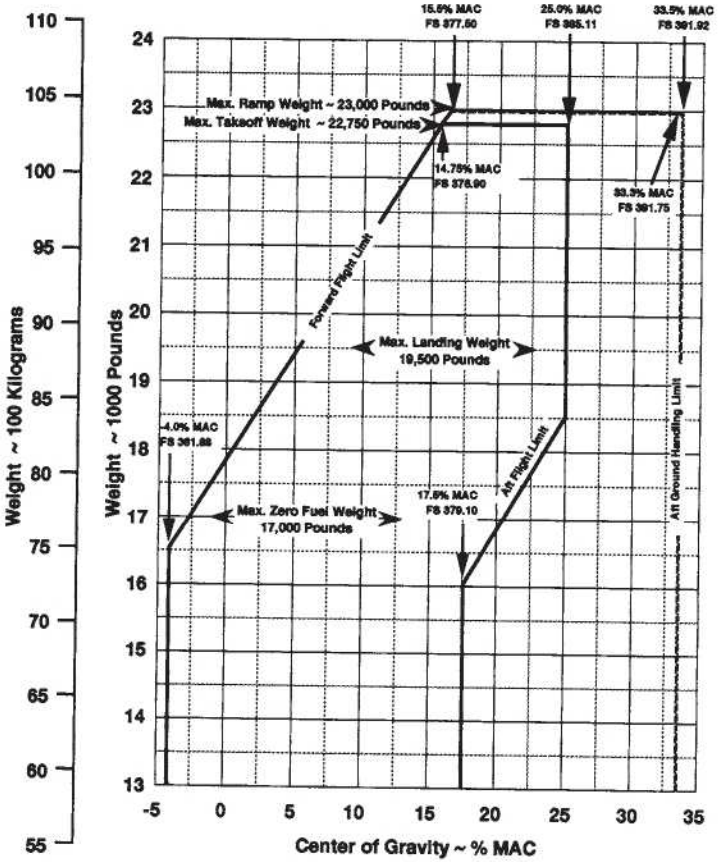
Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 22,750 pounds (10,319 kg) and tapers to F.S. 378.70 (17.0% MAC) at 23,000 pounds (10,433 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 391.75 (33.3% MAC) at 23,000 pounds (10,433 kg).

Figure 6-1

CENTER-OF-GRAVITY ENVELOPE

EFFECTIVITY

Aircraft 60-049 & Subsequent with Standard 22,750 Lb (10,319 kg) Takeoff Weight



Forward Flight Limit — F.S.361.88 (-4.0% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 376.90 (14.75% MAC) at 22,750 pounds (10,319 kg).

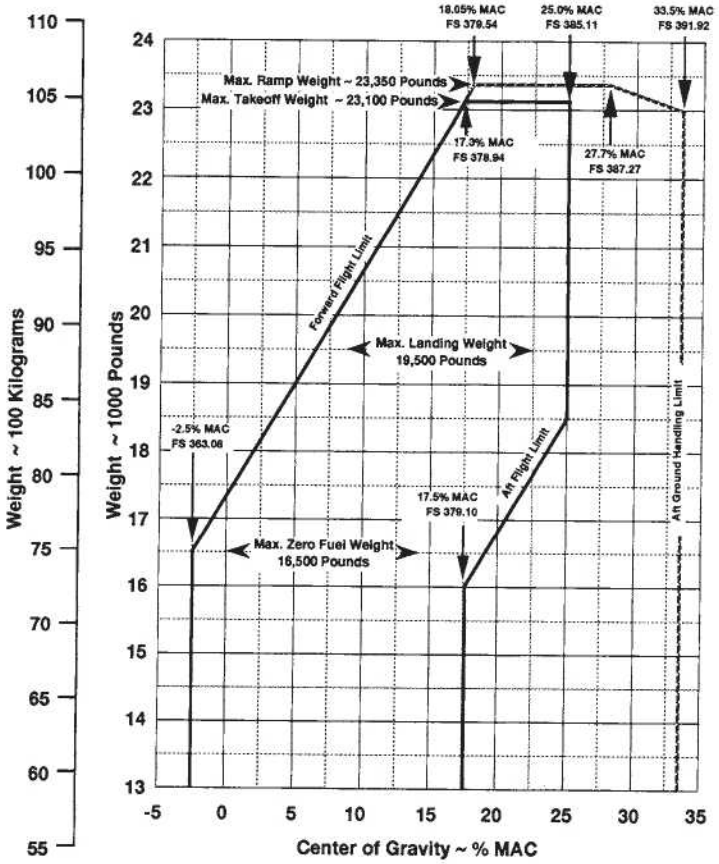
Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 22,750 pounds (10,319 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 22,750 pounds (10,319 kg) and tapers to F.S. 377.50 (15.5% MAC) at 23,000 pounds (10,433 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 391.75 (33.3% MAC) at 23,000 pounds (10,433 kg).

Figure 6-1.1

CENTER-OF-GRAVITY ENVELOPE

EFFECTIVITY
Aircraft with Optional
23,100 Lb (10,478 kg) Takeoff Weight



Forward Flight Limit — F.S. 363.08 (-2.5% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.94 (17.3% MAC) at 23,100 pounds (10,478 kg).

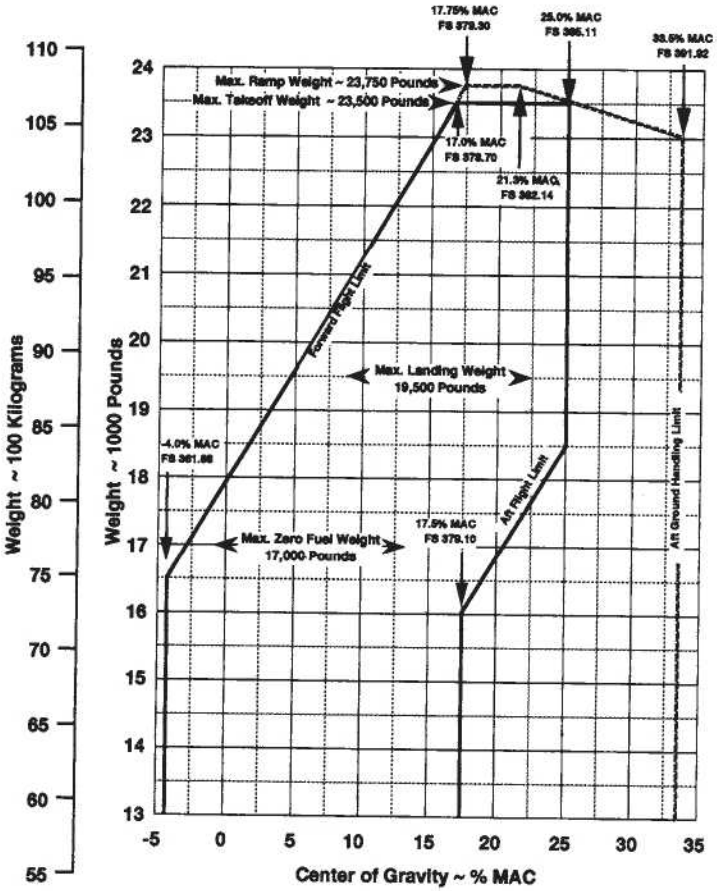
Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 23,100 pounds (10,478 kg).

Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 23,100 pounds (10,478 kg) and tapers to F.S. 379.54 (18.05% MAC) at 23,350 pounds (10,592 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 387.27 (27.7% MAC) at 23,350 pounds (10,592 kg).

Figure 6-1.2

CENTER-OF-GRAVITY ENVELOPE

EFFECTIVITY
Aircraft with Optional
23,500 Lb (10,660 kg) Takeoff Weight



Forward Flight Limit — F.S. 361.88 (-4.0% MAC) for all weights up to and including 16,500 pounds (7484 kg) and tapers to F.S. 378.70 (17.0% MAC) at 23,500 pounds (10,660 kg).

Aft Flight Limit — F.S. 379.10 (17.5% MAC) for all weights up to and including 16,000 pounds (7258 kg), tapers to F.S. 385.11 (25.0% MAC) at 18,500 pounds (8392 kg), remains at F.S. 385.11 (25.0% MAC) up to and including 23,500 pounds (10,660 kg).

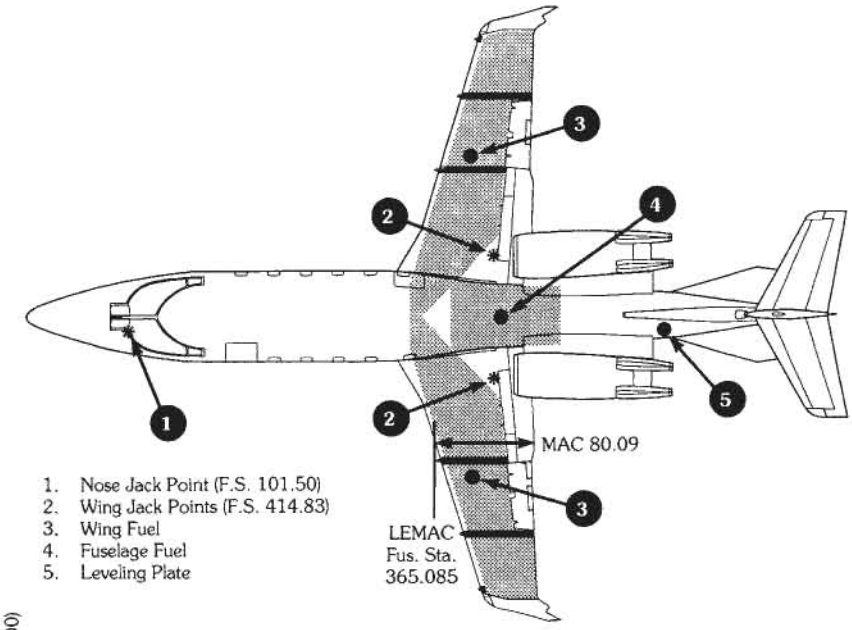
Ground Handling Limit — The forward limit is the same as the forward flight limit up to and including 23,500 pounds (10,660 kg) and tapers to F.S. 379.30 (17.75% MAC) at 23,750 pounds (10,773 kg). The aft limit is F.S. 391.92 (33.5% MAC) for all weights up to and including 22,987 pounds (10,427 kg) and tapers to F.S. 382.14 (21.3% MAC) at 23,750 pounds (10,773 kg).

Figure 6-1.3

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Figure 6-2

DIMENSIONAL DATA



NOSE WHEEL	℄ WHEEL FUS. STA.	MAIN WHEELS	℄ WHEEL FUS.STA.
FULLY COMPRESSED	92.72	FULLY COMPRESSED	397.00
STATIC	92.42	STATIC	396.82
FULLY EXTENDED	91.36	FULLY EXTENDED	396.04

Figure 6-3

LINEAR CONVERSIONS

- To convert from centimeters to inches, find, in the bold face columns, the number of centimeters to be converted. The equivalent number of inches is read in the adjacent column headed INCHES.
- To convert from inches to centimeters, find, in the bold face columns, the number of inches to be converted. The equivalent number of centimeters is read in the adjacent column headed CENTIMETERS.

CENTIMETERS	◄►	INCHES	CENTIMETERS	◄►	INCHES
2.54	**1**	0.39	939.80	**370**	145.67
5.08	**2**	0.79	965.20	**380**	149.61
7.62	**3**	1.18	990.60	**390**	153.54
10.16	**4**	1.57	1016.00	**400**	157.48
12.70	**5**	1.97	1041.40	**410**	161.42
15.24	**6**	2.36	1066.80	**420**	165.35
17.78	**7**	2.76	1092.20	**430**	169.29
20.32	**8**	3.15	1117.60	**440**	173.23
22.86	**9**	3.54	1143.00	**450**	177.16
25.40	**10**	3.94	1168.40	**460**	181.10
50.80	**20**	7.87	1193.80	**470**	185.04
76.20	**30**	11.81	1219.20	**480**	188.98
101.60	**40**	15.75	1244.60	**490**	192.91
127.00	**50**	19.68	1270.00	**500**	196.85
152.40	**60**	23.62	1295.40	**510**	200.79
177.80	**70**	27.56	1320.80	**520**	204.72
203.20	**80**	31.50	1346.20	**530**	208.66
228.60	**90**	35.43	1371.60	**540**	212.60
254.00	**100**	39.37	1397.00	**550**	216.53
279.40	**110**	43.31	1422.40	**560**	220.47
304.80	**120**	47.24	1447.80	**570**	224.41
330.20	**130**	51.18	1473.20	**580**	228.35
355.60	**140**	55.12	1498.60	**590**	232.28
381.00	**150**	59.05	1524.00	**600**	236.22
406.40	**160**	62.99	1549.40	**610**	240.16
431.80	**170**	66.93	1574.80	**620**	244.09
457.20	**180**	70.87	1600.20	**630**	248.03
482.60	**190**	74.80	1625.60	**640**	251.97
508.00	**200**	78.74	1651.00	**650**	255.90
533.40	**210**	82.68	1676.40	**660**	259.84
558.80	**220**	86.61	1701.80	**670**	263.78
584.20	**230**	90.55	1727.20	**680**	267.72
609.60	**240**	94.49	1752.60	**690**	271.65
635.00	**250**	98.42	1778.00	**700**	275.59
660.40	**260**	102.36	1803.40	**710**	279.53
685.80	**270**	106.30	1828.80	**720**	283.46
711.20	**280**	110.24	1854.20	**730**	287.40
736.60	**290**	114.17	1879.60	**740**	291.34
762.00	**300**	118.11	1905.00	**750**	295.27
787.40	**310**	122.05	1930.40	**760**	299.21
812.80	**320**	125.98	1955.80	**770**	303.15
838.20	**330**	129.92	1981.20	**780**	307.09
863.60	**340**	133.86	2006.60	**790**	311.02
889.00	**350**	137.79	2032.00	**800**	314.96
914.40	**360**	141.73			

Figure 6-4

VOLUME CONVERSIONS

- To convert from liters to gallons, find, in the bold face columns, the number of liters to be converted. The equivalent number of gallons is read in the adjacent column headed GALLONS.
- To convert from gallons to liters, find, in the bold face columns, the number of gallons to be converted. The equivalent number of liters is read in the adjacent column headed LITERS.

LITERS	◄►	GALLONS	LITERS	◄►	GALLONS	LITERS	◄►	GALLONS
18.9	**5**	1.3	1476.2	**390**	103.0	2952.3	**780**	206.1
37.9	**10**	2.6	1514.0	**400**	105.7	2990.2	**790**	208.7
75.7	**20**	5.3	1551.9	**410**	108.3	3028.0	**800**	211.4
113.6	**30**	7.9	1589.7	**420**	111.0	3065.9	**810**	214.0
151.4	**40**	10.6	1627.6	**430**	113.6	3103.7	**820**	216.6
189.3	**50**	13.2	1665.4	**440**	116.2	3141.6	**830**	219.3
227.1	**60**	15.9	1703.3	**450**	118.9	3179.4	**840**	221.9
265.0	**70**	18.5	1741.1	**460**	121.5	3217.3	**850**	224.6
302.8	**80**	21.1	1779.0	**470**	124.2	3255.1	**860**	227.2
340.7	**90**	23.8	1816.8	**480**	126.8	3293.0	**870**	229.9
378.5	**100**	26.4	1854.7	**490**	129.5	3330.8	**880**	232.5
416.4	**110**	29.1	1892.5	**500**	132.1	3368.7	**890**	235.1
454.2	**120**	31.7	1930.4	**510**	134.7	3406.5	**900**	237.8
492.1	**130**	34.3	1968.2	**520**	137.4	3444.4	**910**	240.4
529.9	**140**	37.0	2006.1	**530**	140.0	3482.2	**920**	243.1
567.8	**150**	39.6	2043.9	**540**	142.7	3520.1	**930**	245.7
605.6	**160**	42.3	2081.8	**550**	145.3	3557.9	**940**	248.3
643.5	**170**	44.9	2119.6	**560**	148.0	3595.8	**950**	251.0
681.3	**180**	47.6	2157.5	**570**	150.6	3633.6	**960**	253.6
719.2	**190**	50.2	2195.3	**580**	153.2	3671.5	**970**	256.3
757.0	**200**	52.8	2233.2	**590**	155.9	3709.3	**980**	258.9
794.9	**210**	55.5	2271.0	**600**	158.5	3747.2	**990**	261.6
832.7	**220**	58.1	2308.9	**610**	161.2	3785.0	**1000**	264.2
870.6	**230**	60.8	2346.7	**620**	163.8	4163.5	**1100**	290.6
908.4	**240**	63.4	2384.6	**630**	166.4	4542.0	**1200**	317.0
946.3	**250**	66.1	2422.4	**640**	169.1	4920.5	**1300**	343.5
984.1	**260**	68.7	2460.3	**650**	171.7	5299.0	**1400**	369.9
1022.0	**270**	71.3	2498.1	**660**	174.4	5677.5	**1500**	396.3
1059.8	**280**	74.0	2536.0	**670**	177.0	6056.0	**1600**	422.7
1097.7	**290**	76.6	2573.8	**680**	179.7	6434.5	**1700**	449.1
1135.5	**300**	79.3	2611.7	**690**	182.3	6813.0	**1800**	475.6
1173.4	**310**	81.9	2649.5	**700**	184.9	7191.5	**1900**	502.0
1211.2	**320**	84.5	2687.4	**710**	187.6	7570.0	**2000**	528.4
1249.1	**330**	87.2	2725.2	**720**	190.2	7948.5	**2100**	554.8
1286.9	**340**	89.8	2763.1	**730**	192.9	8327.0	**2200**	581.2
1324.8	**350**	92.5	2800.9	**740**	195.5	8705.5	**2300**	607.7
1362.6	**360**	95.1	2838.8	**750**	198.2	9084.0	**2400**	634.1
1400.5	**370**	97.8	2876.6	**760**	200.8	9462.5	**2500**	660.5
1438.3	**380**	100.4	2914.5	**770**	203.4	9841.0	**2600**	686.9

Figure 6-5

WEIGHT CONVERSIONS

- To convert from kilograms to pounds, find, in the bold face columns, the number of kilograms to be converted. The equivalent number of pounds is read in the adjacent column headed POUNDS.
- To convert from pounds to kilograms, find, in the bold face columns, the number of pounds to be converted. The equivalent number of kilograms is read in the adjacent column headed KILOGRAMS.

KILOGRAMS ◀ ▶ POUNDS			KILOGRAMS ◀ ▶ POUNDS			KILOGRAMS ◀ ▶ POUNDS		
4.5	**10**	22.0	208.7	**460**	1014.1	412.8	**910**	2006.2
9.1	**20**	44.1	213.2	**470**	1036.2	417.3	**920**	2028.2
13.6	**30**	66.1	217.7	**480**	1058.2	421.8	**930**	2050.3
18.1	**40**	88.2	222.3	**490**	1080.3	426.4	**940**	2072.3
22.7	**50**	110.2	226.8	**500**	1102.3	430.9	**950**	2094.4
27.2	**60**	132.3	231.3	**510**	1124.3	435.5	**960**	2116.4
31.8	**70**	154.3	235.9	**520**	1146.4	440.0	**970**	2138.5
36.3	**80**	176.4	240.4	**530**	1168.4	444.5	**980**	2160.5
40.8	**90**	198.4	244.9	**540**	1190.5	449.1	**990**	2182.6
45.4	**100**	220.5	249.5	**550**	1212.5	453.6	**1000**	2204.6
49.9	**110**	242.5	254.0	**560**	1234.6	499.0	**1100**	2425.1
54.4	**120**	264.6	258.6	**570**	1256.6	544.3	**1200**	2645.5
59.0	**130**	286.6	263.1	**580**	1278.7	589.7	**1300**	2866.0
63.5	**140**	308.6	267.6	**590**	1300.7	635.0	**1400**	3086.4
68.0	**150**	330.7	272.2	**600**	1322.8	680.4	**1500**	3306.9
72.6	**160**	352.7	276.7	**610**	1344.8	907.2	**2000**	4409.2
77.1	**170**	374.8	281.2	**620**	1366.9	1134.0	**2500**	5511.5
81.6	**180**	396.8	285.8	**630**	1388.9	1360.8	**3000**	6613.8
86.2	**190**	418.9	290.3	**640**	1410.9	1587.6	**3500**	7716.1
90.7	**200**	440.9	294.8	**650**	1433.0	1814.4	**4000**	8818.4
95.3	**210**	463.0	299.4	**660**	1455.0	2041.2	**4500**	9920.7
99.8	**220**	485.0	303.9	**670**	1477.1	2268.0	**5000**	11023.0
104.3	**230**	507.1	308.4	**680**	1499.1	2494.8	**5500**	12125.3
108.9	**240**	529.1	313.0	**690**	1521.2	2721.6	**6000**	13227.6
113.4	**250**	551.1	317.5	**700**	1543.2	2948.4	**6500**	14329.9
117.9	**260**	573.2	322.1	**710**	1565.3	3175.2	**7000**	15432.2
122.5	**270**	595.2	326.6	**720**	1587.3	3402.0	**7500**	16534.5
127.0	**280**	617.3	331.1	**730**	1609.4	3628.8	**8000**	17636.8
131.5	**290**	639.3	335.7	**740**	1631.4	3855.6	**8500**	18739.1
136.1	**300**	661.4	340.2	**750**	1653.4	4082.4	**9000**	19841.4
140.6	**310**	683.4	344.7	**760**	1675.5	4309.2	**9500**	20943.7
145.2	**320**	705.5	349.3	**770**	1697.5	4536.0	**10000**	22046.0
149.7	**330**	727.5	353.8	**780**	1719.6	4989.6	**11000**	24250.6
154.2	**340**	749.6	358.3	**790**	1741.6	5443.2	**12000**	26455.2
158.8	**350**	771.6	362.9	**800**	1763.7	5896.8	**13000**	28659.8
163.3	**360**	793.7	367.4	**810**	1785.7	6350.4	**14000**	30864.4
167.8	**370**	815.7	371.9	**820**	1807.8	6804.0	**15000**	33069.0
172.4	**380**	837.7	376.5	**830**	1829.8	7257.6	**16000**	35273.6
176.9	**390**	859.8	381.0	**840**	1851.9	7711.1	**17000**	37478.2
181.4	**400**	881.8	385.6	**850**	1873.9	8164.7	**18000**	39682.8
186.0	**410**	903.9	390.1	**860**	1896.0	8618.3	**19000**	41887.4
190.5	**420**	925.9	394.6	**870**	1918.0	9071.9	**20000**	44092.0
195.0	**430**	948.0	399.2	**880**	1940.0	9525.5	**21000**	46296.6
199.6	**440**	970.0	403.7	**890**	1962.1	9979.1	**22000**	48501.2
204.1	**450**	992.1	408.2	**900**	1984.1	10432.7	**23000**	50705.8

Figure 6-6

LOADING INSTRUCTIONS

It is the responsibility of the pilot to see that this aircraft is loaded within the weight and C.G. limits. The loading form (figure 6-7) may be used.

1. Enter the aircraft's BASIC EMPTY WEIGHT and MOMENT from the current weighing record.
2. Enter the payload weights and moments (crew, passengers, provisions, baggage, etc.) using the Payload Moments Charts provided in the aircraft's weight and balance data package.
3. Compute the ZERO FUEL WEIGHT and MOMENT (OPERATING WEIGHT values plus Passenger and Baggage values).
4. Enter the fuel weights and moments using the Fuel Moments Charts, figure 6-10.
5. Compute RAMP WEIGHT and MOMENT (ZERO FUEL WEIGHT values plus fuel values).
6. Compute TAKEOFF WEIGHT and MOMENT (RAMP WEIGHT values minus Taxi Burnoff out of wings).
7. Compare TAKEOFF WEIGHT and MOMENT with weight and C.G. limits from Weight-Moment-C.G. Envelope, figure 6-8, or Center-of-Gravity Table, figure 6-9. If not within limits, reduce weight or rearrange load as required to obtain weight and C.G. within limits.
8. LANDING WEIGHT and MOMENT may be calculated by adding the fuel weight and moment remaining at the destination to the ZERO FUEL WEIGHT.
9. The formula to calculate the C.G. in % MAC is:

$$\text{C.G. in \% MAC} = \left[\frac{\text{Fuselage Station (Center of Gravity)} - 365.085}{80.09} \right] \times 100$$

AIRCRAFT LOADING FORM

Interior Configuration _____

Missing or Additional Equipment _____

	WEIGHT	F.S.	MOM/1000	% MAC
BASIC EMPTY WEIGHT				
Missing/Additional Equipment				—
Crew				—
Provisions — Refreshment Cabinet				—
Provisions — Refreshment Cabinet				—
Provisions — Vanity/Lavatory				—
Provisions — Toilet				—
Water				—
Miscellaneous				—
				—
OPERATING WEIGHT EMPTY				
Baggage — Cabin				—
Baggage — Tailcone				—
Passenger 1				—
Passenger 2				—
Passenger 3				—
Passenger 4				—
Passenger 5				—
Passenger 6				—
Passenger 7				—
Passenger 8				—
				—
ZERO FUEL WEIGHT				
Fuel — Fuselage Tank				—
Fuel — Wing Tanks				—
RAMP WEIGHT				
Taxi Burnoff Out of Wings *				—
TAKEOFF GROSS WEIGHT				

ZERO FUEL WEIGHT				
Fuel — Wing Tanks				—
Fuel — Fuselage Tank				—
LANDING WEIGHT				

* Fuel burnoff is approximately 3.7 pounds per engine per minute.

Figure 6-7

WEIGHT-MOMENT-C.G. ENVELOPE

NOTE

The landing gear retraction moment is (minus) 2655 inch-pounds.

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

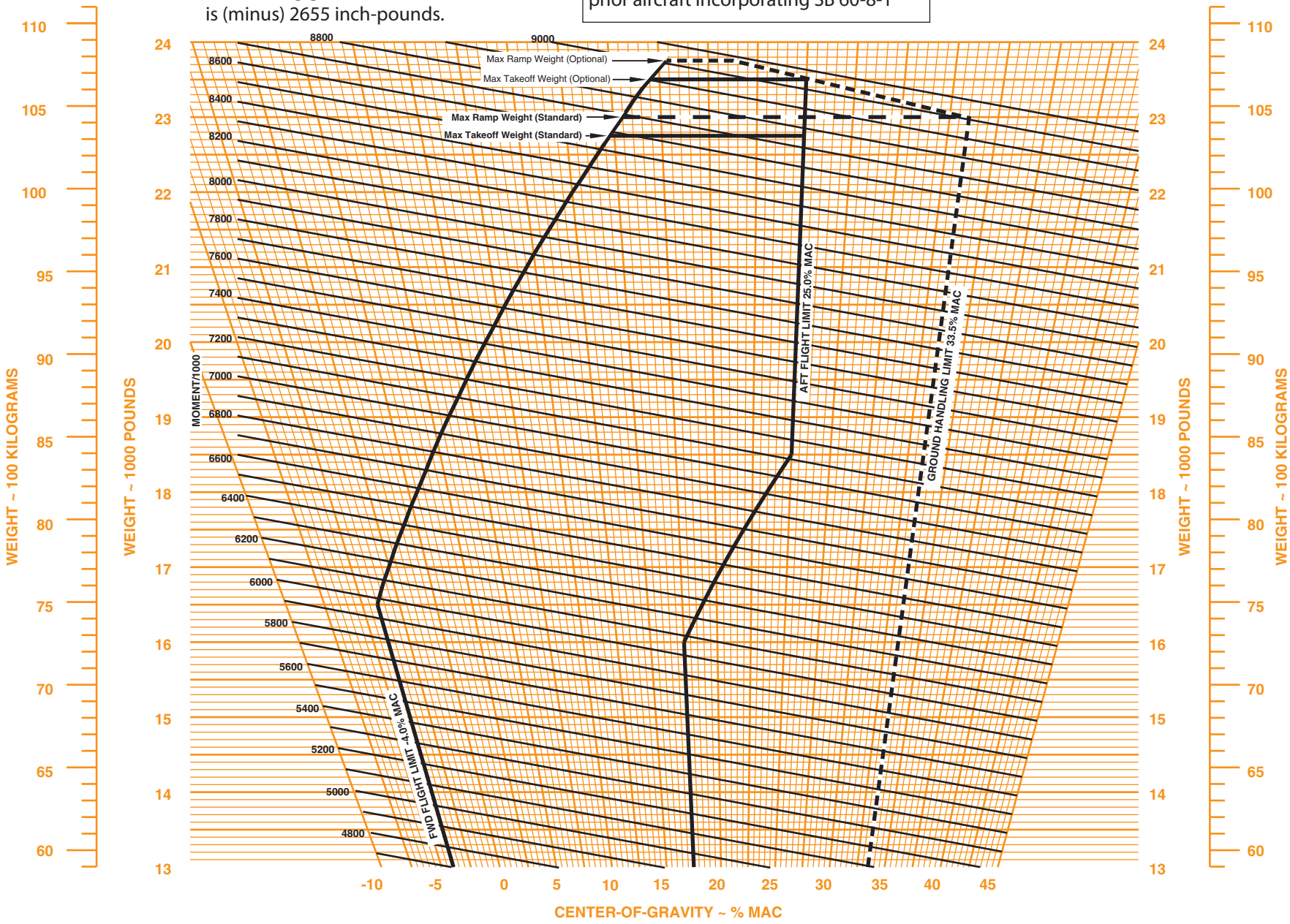


Figure 6-8

WEIGHT-MOMENT-C.G. ENVELOPE

NOTE

The landing gear retraction moment is (minus) 2655 inch-pounds.

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

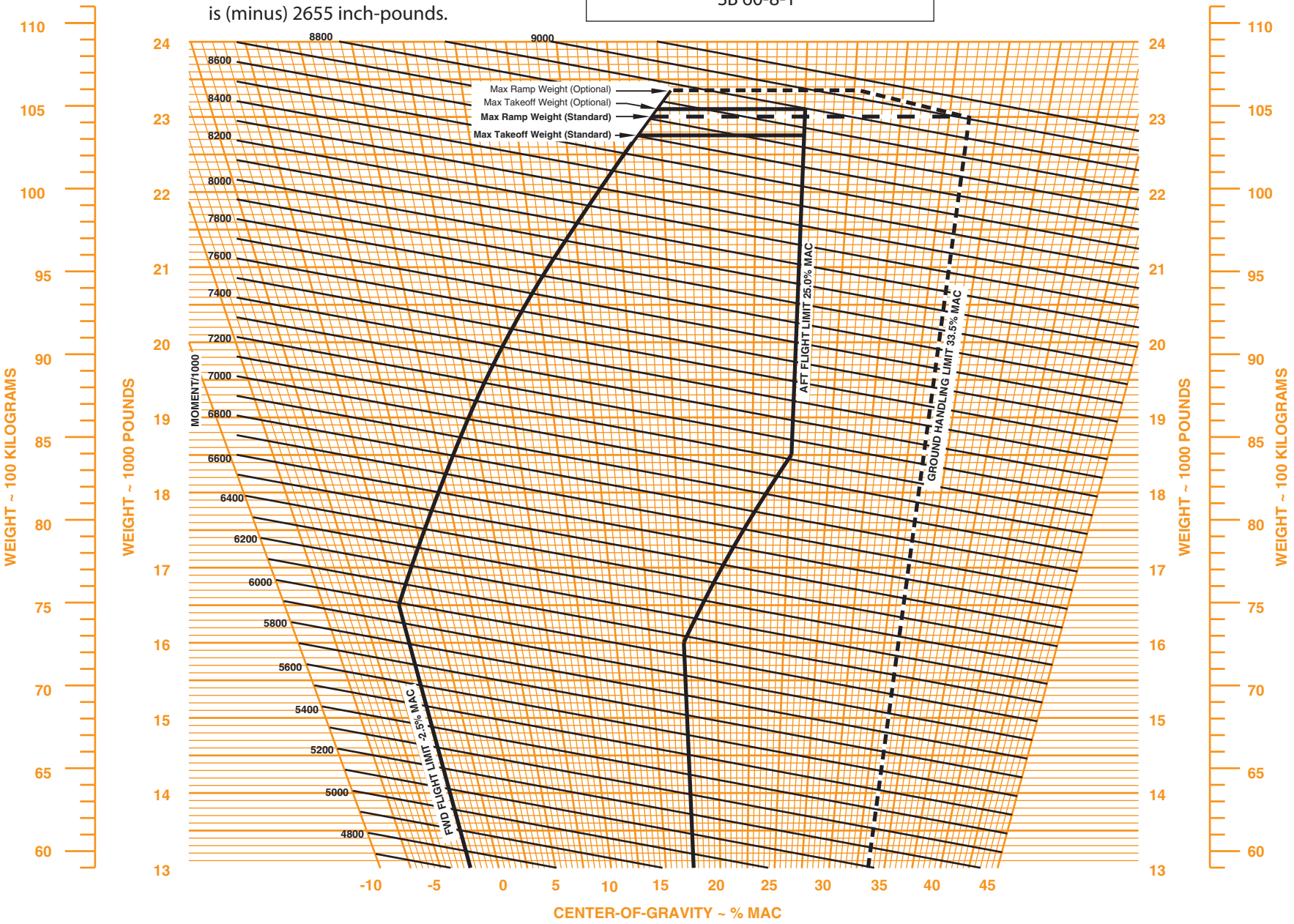


Figure 6-8.1

CENTER-OF-GRAVITY TABLE

NOTE

Data given for weights above 23,500 pounds reflects the ground handling envelope only.

EFFECTIVITY

60-049 & Subsequent and prior aircraft incorporating SB 60-8-1

MOMENT / 1000

POUNDS GROSS WEIGHT	FWD LIMIT % MAC	FWD LIMIT STA		0 % MAC STA 365.08	5 % MAC STA 369.09	10 % MAC STA 373.09	15% MAC STA 377.10	20% MAC STA 381.10	AFT LIMIT % MAC	AFT LIMIT STA	
13000	-4 00	361 88	4704 46	4746 10	4798 16	4850 22	4902 28		17 50	379 10	4928 31
13100	-4 00	361 88	4740 65	4782 61	4835 07	4887 53	4939 99		17 50	379 10	4966 22
13200	-4 00	361 88	4776 83	4819 12	4871 98	4924 84	4977 70		17 50	379 10	5004 13
13300	-4 00	361 88	4813 02	4855 63	4908 89	4962 15	5015 41		17 50	379 10	5042 04
13400	-4.00	361.88	4849.21	4892.14	4945.80	4999.46	5053.12		17.50	379.10	5079.95
13500	-4 00	361 88	4885 40	4928 65	4982 71	5036 77	5090 83		17 50	379 10	5117 86
13600	-4 00	361 88	4921 59	4965 16	5019 62	5074 08	5128 54		17 50	379 10	5155 77
13700	-4 00	361 88	4957 78	5001 66	5056 53	5111 39	5166 25		17 50	379 10	5193 68
13800	-4 00	361 88	4993 96	5038 17	5093 44	5148 70	5203 96		17 50	379 10	5231 59
13900	-4.00	361.88	5030.15	5074.68	5130.34	5186.01	5241.67		17.50	379.10	5269.50
14000	-4 00	361 88	5066 34	5111 19	5167 25	5223 32	5279 38		17 50	379 10	5307 41
14100	-4 00	361 88	5102 53	5147 70	5204 16	5260 63	5317 09	BEYOND	17 50	379 10	5345 32
14200	-4 00	361 88	5138 72	5184 21	5241 07	5297 93	5354 80	LIMITS	17 50	379 10	5383 23
14300	-4 00	361 88	5174 90	5220 72	5277 98	5335 24	5392 51		17 50	379 10	5421 14
14400	-4.00	361.88	5211.09	5257.22	5314.89	5372.55	5430.22		17.50	379.10	5459.05
14500	-4 00	361 88	5247 28	5293 73	5351 80	5409 86	5467 93		17 50	379 10	5496 96
14600	-4 00	361 88	5283 47	5330 24	5388 71	5447 17	5505 64		17 50	379 10	5534 87
14700	-4 00	361 88	5319 66	5366 75	5425 62	5484 48	5543 35		17 50	379 10	5572 78
14800	-4 00	361 88	5355 84	5403 26	5462 52	5521 79	5581 06		17 50	379 10	5610 69
14900	-4.00	361.88	5392.03	5439.77	5499.43	5559.10	5618.77		17.50	379.10	5648.60
15000	-4 00	361 88	5428 22	5476 27	5536 34	5596 41	5656 48		17 50	379 10	5686 51
15100	-4 00	361 88	5464 41	5512 78	5573 25	5633 72	5694 19		17 50	379 10	5724 42
15200	-4 00	361 88	5500 60	5549 29	5610 16	5671 03	5731 90		17 50	379 10	5762 33
15300	-4 00	361 88	5536 79	5585 80	5647 07	5708 34	5769 61		17 50	379 10	5800 24
15400	-4.00	361.88	5572.97	5622.31	5683.98	5745.65	5807.32		17.50	379.10	5838.15
15500	-4 00	361 88	5609 16	5658 82	5720 89	5782 96	5845 03		17 50	379 10	5876 06
15600	-4 00	361 88	5645 35	5695 33	5757 80	5820 27	5882 74		17 50	379 10	5913 97
15700	-4 00	361 88	5681 54	5731 83	5794 71	5857 58	5920 45		17 50	379 10	5951 88
15800	-4 00	361 88	5717 73	5768 34	5831 61	5894 89	5958 16		17 50	379 10	5989 79
15900	-4.00	361.88	5753.91	5804.85	5868.52	5932.19	5995.87		17.50	379.10	6027.70
16000	-4 00	361 88	5790 10	5841 36	5905 43	5969 50	6033 58		17 50	379 10	6065 61
16100	-4 00	361 88	5826 29	5877 87	5942 34	6006 81	6071 29		17 80	379 34	6107 39
16200	-4 00	361 88	5862 48	5914 38	5979 25	6044 12	6109 00		18 10	379 58	6149 22
16300	-4 00	361 88	5898 67	5950 89	6016 16	6081 43	6146 71		18 40	379 82	6191 09
16400	-4.00	361.88	5934.85	5987.39	6053.07	6118.74	6184.42		18.70	380.06	6233.01
16500	-4 00	361 88	5971 04	6023 90	6089 98	6156 05	6222 13		19 00	380 30	6274 98
16600	-3 70	362 12	6011 22	6060 41	6126 89	6193 36	6259 84		19 30	380 54	6317 00
16700	-3 40	362 36	6051 44	6096 92	6163 79	6230 67	6297 54		19 60	380 78	6359 07
16800	-3 10	362 60	6091 72	6133 43	6200 70	6267 98	6335 25		19 90	381 02	6401 18
16900	-2.80	362.84	6132.04	6169.94	6237.61	6305.29	6372.96	6440.64	20.20	381.26	6443.35
17000	-2 50	363 08	6172 41	6206 44	6274 52	6342 60	6410 67	6478 75	20 50	381 50	6485 56
17100	-2 20	363 32	6212 82	6242 95	6311 43	6379 91	6448 38	6516 86	20 80	381 74	6527 82
17200	-1 90	363 56	6253 29	6279 46	6348 34	6417 22	6486 09	6554 97	21 10	381 98	6570 12
17300	-1 60	363 80	6293 80	6315 97	6385 25	6454 53	6523 80	6593 08	21 40	382 22	6612 48
17400	-1.30	364.04	6334.36	6352.48	6422.16	6491.84	6561.51	6631.19	21.70	382.46	6654.88
17500	-1 00	364 28	6374 97	6388 99	6459 07	6529 14	6599 22	6669 30	22 00	382 70	6697 33
17600	-0 70	364 52	6415 63	6425 50	6495 98	6566 45	6636 93	6707 41	22 30	382 95	6739 83
17700	-0 40	364 76	6456 33	6462 00	6532 88	6603 76	6674 64	6745 52	22 60	383 19	6782 38
17800	-0 10	365 00	6497 09	6498.51	6569 79	6641 07	6712 35	6783 63	22 90	383 43	6824 98
17900	0.20	365.25	6537.89		6606.70	6678.38	6750.06	6821.74	23.20	383.67	6867.62
18000	0 50	365 49	6578 74		6643 61	6715 69	6787 77	6859 85	23 50	383 91	6910 31
18100	0 80	365 73	6619 64		6680 52	6753 00	6825 48	6897 96	23 80	384 15	6953 05
18200	1 10	365 97	6660 58		6717 43	6790 31	6863 19	6936 07	24 10	384 39	6995 84
18300	1 40	366 21	6701 57		6754 34	6827 62	6900 90	6974 18	24 40	384 63	7038 67
18400	1.70	366.45	6742.62		6791.25	6864.93	6938.61	7012.30	24.70	384.87	7081.56

POUNDS GROSS WEIGHT	FWD LIMIT % MAC	FWD LIMIT STA		5 % MAC STA 369.09	10 % MAC STA 373.09	15% MAC STA 377.10	20% MAC STA 381.10	AFT LIMIT % MAC	AFT LIMIT STA	
18500	2 00	366 69	6783 71	6828 16	6902 24	6976 32	7050 41	25 00	385 11	7124 49
18600	2 30	366 93	6824 84	6865 06	6939 55	7014 03	7088 52	25 00	385 11	7163 00
18700	2 60	367 17	6866 03	6901 97	6976 86	7051 74	7126 63	25 00	385 11	7201 51
18800	2 90	367 41	6907 26	6938 88	7014 17	7089 45	7164 74	25 00	385 11	7240 02
18900	3.20	367.65	6948.54	6975.79	7051.48	7127.16	7202.85	25.00	385.11	7278.53
19000	3 50	367 89	6989 87	7012 70	7088 79	7164 87	7240 96	25 00	385 11	7317 04
19100	3 80	368 13	7031 25	7049 61	7126 10	7202 58	7279 07	25 00	385 11	7355 55
19200	4 10	368 37	7072 68	7086 52	7163 40	7240 29	7317 18	25 00	385 11	7394 06
19300	4 40	368 61	7114 15	7123 43	7200 71	7278 00	7355 29	25 00	385 11	7432 57
19400	4.70	368.85	7155.68	7160.34	7238.02	7315.71	7393.40	25.00	385.11	7471.09
19500	5 00	369 09	7197 25	7197.25	7275 33	7353 42	7431 51	25 00	385 11	7509 60
19600	5 30	369 33	7238 86		7312 64	7391 13	7469 62	25 00	385 11	7548 11
19700	5 60	369 57	7280 53		7349 95	7428 84	7507 73	25 00	385 11	7586 62
19800	5 90	369 81	7322 24		7387 26	7466 55	7545 84	25 00	385 11	7625 13
19900	6.20	370.05	7364.01		7424.57	7504.26	7583.95	25.00	385.11	7663.64
20000	6 50	370 29	7405 82		7461 88	7541 97	7622 06	25 00	385 11	7702 15
20100	6 80	370 53	7447 68		7499 19	7579 68	7660 17	25 00	385 11	7740 66
20200	7 10	370 77	7489 58		7536 50	7617 39	7698 28	25 00	385 11	7779 17
20300	7 40	371 01	7531 54		7573 81	7655 10	7736 39	25 00	385 11	7817 68
20400	7.70	371.25	7573.54		7611.12	7692.81	7774.50	25.00	385.11	7856.19
20500	8 00	371 49	7615 59		7648 43	7730 52	7812 61	25 00	385 11	7894 70
20600	8 30	371 73	7657 69		7685 74	7768 23	7850 72	25 00	385 11	7933 21
20700	8 60	371 97	7699 84		7723 05	7805 94	7888 83	25 00	385 11	7971 73
20800	8 90	372 21	7742 03		7760 36	7843 65	7926 94	25 00	385 11	8010 24
20900	9.20	372.45	7784.27		7797.66	7881.36	7965.05	25.00	385.11	8048.75
21000	9 50	372 69	7826 56		7834 97	7919 07	8003 16	25 00	385 11	8087 26
21100	9 80	372 93	7868 90		7872 28	7956 78	8041 27	25 00	385 11	8125 77
21200	10 10	373 17	7911 29			7994 49	8079 38	25 00	385 11	8164 28
21300	10 40	373 41	7953 73			8032 20	8117 49	25 00	385 11	8202 79
21400	10.70	373.65	7996.21			8069.91	8155.60	25.00	385.11	8241.30
21500	11 00	373 89	8038 74			8107 62	8193 71	25 00	385 11	8279 81
21600	11 30	374 14	8081 32			8145 33	8231 82	25 00	385 11	8318 32
21700	11 60	374 38	8123 95			8183 04	8269 94	25 00	385 11	8356 83
21800	11 90	374 62	8166 62			8220 75	8308 05	25 00	385 11	8395 34
21900	12.20	374.86	8209.35			8258.46	8346.16	25.00	385.11	8433.85
22000	12 50	375 10	8252 12			8296 17	8384 27	25 00	385 11	8472 36
22100	12 80	375 34	8294 94			8333 88	8422 38	25 00	385 11	8510 88
22200	13 10	375 58	8337 80			8371 59	8460 49	25 00	385 11	8549 39
22300	13 40	375 82	8380 72			8409 30	8498 60	25 00	385 11	8587 90
22400	13.70	376.06	8423.68			8447.01	8536.71	25.00	385.11	8626.41
22500	14 00	376 30	8466 70			8484 72	8574 82	25 00	385 11	8664 92
22600	14 30	376 54	8509 76	BEYOND		8522 43	8612 93	25 00	385 11	8703 43
22700	14 60	376 78	8552 86	LIMITS		8560 14	8651 04	25 00	385 11	8741 94
22800	14 90	377 02	8596 02			8597 85	8689 15	25 00	385 11	8780 45
22900	15.20	377.26	8639.22				8727.26	25.00	385.11	8818.96
23000	15 50	377 50	8682 48				8765 37	25 00	385 11	8857 47
23100	15 80	377 74	8725 78				8803 48	25 00	385 11	8895 98
23200	16 10	377 98	8769 12				8841 59	25 00	385 11	8934 49
23300	16 40	378 22	8812 52				8879 70	25 00	385 11	8973 00
23400	16.70	378.46	8855.96				8917.81	25.00	385.11	9011.52
23500	17 00	378 70	8899 46				8955 92	25 00	385 11	9050 03
23600	17 30	378 94	8943 00				8994 03	23 70	384 07	9063 94
23700	17 60	379 18	8986 59				9032 14	22 10	382 78	9071 99
23750	17.75	379.30	9008.40				9051.20	21.30	382.14	9075.92

Figure 6-9

CENTER-OF-GRAVITY TABLE

NOTE

Data given for weights above 23,100 pounds reflects the ground handling envelope only.

EFFECTIVITY

60-001 thru 60-048 not incorporating SB 60-8-1

MOMENT / 1000

POUNDS GROSS WEIGHT	FWD LIMIT % MAC	FWD LIMIT STA		0 % MAC STA 365.08	5 % MAC STA 369.09	10 % MAC STA 373.09	15% MAC STA 377.10	20% MAC STA 381.10	AFT LIMIT % MAC	AFT LIMIT STA	
13000	-2 50	363 08	4720 08	4746 10	4798 16	4850 22	4902 28		17 50	379 10	4928 31
13100	-2 50	363 08	4756 38	4782 61	4835 07	4887 53	4939 99		17 50	379 10	4966 22
13200	-2 50	363 08	4792 69	4819 12	4871 98	4924 84	4977 70		17 50	379 10	5004 13
13300	-2 50	363 08	4829 00	4855 63	4908 89	4962 15	5015 41		17 50	379 10	5042 04
13400	-2.50	363.08	4865.31	4892.14	4945.80	4999.46	5053.12		17.50	379.10	5079.95
13500	-2 50	363 08	4901 62	4928 65	4982 71	5036 77	5090 83		17 50	379 10	5117 86
13600	-2 50	363 08	4937 93	4965 16	5019 62	5074 08	5128 54		17 50	379 10	5155 77
13700	-2 50	363 08	4974 23	5001 66	5056 53	5111 39	5166 25		17 50	379 10	5193 68
13800	-2 50	363 08	5010 54	5038 17	5093 44	5148 70	5203 96		17 50	379 10	5231 59
13900	-2.50	363.08	5046.85	5074.68	5130.34	5186.01	5241.67		17.50	379.10	5269.50
14000	-2 50	363 08	5083 16	5111 19	5167 25	5223 32	5279 38		17 50	379 10	5307 41
14100	-2 50	363 08	5119 47	5147 70	5204 16	5260 63	5317 09	BEYOND	17 50	379 10	5345 32
14200	-2 50	363 08	5155 78	5184 21	5241 07	5297 93	5354 80	LIMITS	17 50	379 10	5383 23
14300	-2 50	363 08	5192 08	5220 72	5277 98	5335 24	5392 51		17 50	379 10	5421 14
14400	-2.50	363.08	5228.39	5257.22	5314.89	5372.55	5430.22		17.50	379.10	5459.05
14500	-2 50	363 08	5264 70	5293 73	5351 80	5409 86	5467 93		17 50	379 10	5496 96
14600	-2 50	363 08	5301 01	5330 24	5388 71	5447 17	5505 64		17 50	379 10	5534 87
14700	-2 50	363 08	5337 32	5366 75	5425 62	5484 48	5543 35		17 50	379 10	5572 78
14800	-2 50	363 08	5373 62	5403 26	5462 52	5521 79	5581 06		17 50	379 10	5610 69
14900	-2.50	363.08	5409.93	5439.77	5499.43	5559.10	5618.77		17.50	379.10	5648.60
15000	-2 50	363 08	5446 24	5476 27	5536 34	5596 41	5656 48		17 50	379 10	5686 51
15100	-2 50	363 08	5482 55	5512 78	5573 25	5633 72	5694 19		17 50	379 10	5724 42
15200	-2 50	363 08	5518 86	5549 29	5610 16	5671 03	5731 90		17 50	379 10	5762 33
15300	-2 50	363 08	5555 17	5585 80	5647 07	5708 34	5769 61		17 50	379 10	5800 24
15400	-2.50	363.08	5591.47	5622.31	5683.98	5745.65	5807.32		17.50	379.10	5838.15
15500	-2 50	363 08	5627 78	5658 82	5720 89	5782 96	5845 03		17 50	379 10	5876 06
15600	-2 50	363 08	5664 09	5695 33	5757 80	5820 27	5882 74		17 50	379 10	5913 97
15700	-2 50	363 08	5700 40	5731 83	5794 71	5857 58	5920 45		17 50	379 10	5951 88
15800	-2 50	363 08	5736 71	5768 34	5831 61	5894 89	5958 16		17 50	379 10	5989 79
15900	-2.50	363.08	5773.02	5804.85	5868.52	5932.19	5995.87		17.50	379.10	6027.70
16000	-2 50	363 08	5809 32	5841 36	5905 43	5969 50	6033 58		17 50	379 10	6065 61
16100	-2 50	363 08	5845 63	5877 87	5942 34	6006 81	6071 29		17 80	379 34	6107 39
16200	-2 50	363 08	5881 94	5914 38	5979 25	6044 12	6109 00		18 10	379 58	6149 22
16300	-2 50	363 08	5918 25	5950 89	6016 16	6081 43	6146 71		18 40	379 82	6191 09
16400	-2.50	363.08	5954.56	5987.39	6053.07	6118.74	6184.42		18.70	380.06	6233.01
16500	-2 50	363 08	5990 87	6023 90	6089 98	6156 05	6222 13		19 00	380 30	6274 98
16600	-2 20	363 32	6031 16	6060 41	6126 89	6193 36	6259 84		19 30	380 54	6317 00
16700	-1 90	363 56	6071 51	6096 92	6163 79	6230 67	6297 54		19 60	380 78	6359 07
16800	-1 60	363 80	6111 90	6133 43	6200 70	6267 98	6335 25		19 90	381 02	6401 18
16900	-1.30	364.04	6152.34	6169.94	6237.61	6305.29	6372.96	6440.64	20.20	381.26	6443.35
17000	-1 00	364 28	6192 83	6206 44	6274 52	6342 60	6410 67	6478 75	20 50	381 50	6485 56
17100	-0 70	364 52	6233 37	6242 95	6311 43	6379 91	6448 38	6516 86	20 80	381 74	6527 82
17200	-0 40	364 76	6273 95	6279 46	6348 34	6417 22	6486 09	6554 97	21 10	381 98	6570 12
17300	-0 10	365 00	6314 58	6315.97	6385 25	6454 53	6523 80	6593 08	21 40	382 22	6612 48
17400	0.20	365.25	6355.27		6422.16	6491.84	6561.51	6631.19	21.70	382.46	6654.88
17500	0 50	365 49	6396 00		6459 07	6529 14	6599 22	6669 30	22 00	382 70	6697 33
17600	0 80	365 73	6436 77		6495 98	6566 45	6636 93	6707 41	22 30	382 95	6739 83
17700	1 10	365 97	6477 60		6532 88	6603 76	6674 64	6745 52	22 60	383 19	6782 38
17800	1 40	366 21	6518 47		6569 79	6641 07	6712 35	6783 63	22 90	383 43	6824 98
17900	1.70	366.45	6559.39		6606.70	6678.38	6750.06	6821.74	23.20	383.67	6867.62
18000	2 00	366 69	6600 36		6643 61	6715 69	6787 77	6859 85	23 50	383 91	6910 31
18100	2 30	366 93	6641 38		6680 52	6753 00	6825 48	6897 96	23 80	384 15	6953 05
18200	2 60	367 17	6682 45		6717 43	6790 31	6863 19	6936 07	24 10	384 39	6995 84
18300	2 90	367 41	6723 56		6754 34	6827 62	6900 90	6974 18	24 40	384 63	7038 67
18400	3.20	367.65	6764.72		6791.25	6864.93	6938.61	7012.30	24.70	384.87	7081.56

POUNDS GROSS WEIGHT	FWD LIMIT % MAC	FWD LIMIT STA		5 % MAC STA 369.09	10 % MAC STA 373.09	15% MAC STA 377.10	20% MAC STA 381.10	AFT LIMIT % MAC	AFT LIMIT STA	
18500	3 50	367 89	6805 93	6828 16	6902 24	6976 32	7050 41	25 00	385 11	7124 49
18600	3 80	368 13	6847 19	6865 06	6939 55	7014 03	7088 52	25 00	385 11	7163 00
18700	4 10	368 37	6888 49	6901 97	6976 86	7051 74	7126 63	25 00	385 11	7201 51
18800	4 40	368 61	6929 85	6938 88	7014 17	7089 45	7164 74	25 00	385 11	7240 02
18900	4.70	368.85	6971.25	6975.79	7051.48	7127.16	7202.85	25.00	385.11	7278.53
19000	5 00	369 09	7012 70		7088 79	7164 87	7240 96	25 00	385 11	7317 04
19100	5 30	369 33	7054 20		7126 10	7202 58	7279 07	25 00	385 11	7355 55
19200	5 60	369 57	7095 74		7163 40	7240 29	7317 18	25 00	385 11	7394 06
19300	5 90	369 81	7137 34		7200 71	7278 00	7355 29	25 00	385 11	7432 57
19400	6.20	370.05	7178.98		7238.02	7315.71	7393.40	25.00	385.11	7471.09
19500	6 50	370 29	7220 67		7275 33	7353 42	7431 51	25 00	385 11	7509 60
19600	6 80	370 53	7262 41		7312 64	7391 13	7469 62	25 00	385 11	7548 11
19700	7 10	370 77	7304 20		7349 95	7428 84	7507 73	25 00	385 11	7586 62
19800	7 40	371 01	7346 03		7387 26	7466 55	7545 84	25 00	385 11	7625 13
19900	7.70	371.25	7387.91		7424.57	7504.26	7583.95	25.00	385.11	7663.64
20000	8 00	371 49	7429 84		7461 88	7541 97	7622 06	25 00	385 11	7702 15
20100	8 30	371 73	7471 82		7499 19	7579 68	7660 17	25 00	385 11	7740 66
20200	8 60	371 97	7513 85		7536 50	7617 39	7698 28	25 00	385 11	7779 17
20300	8 90	372 21	7555 92		7573 81	7655 10	7736 39	25 00	385 11	7817 68
20400	9.20	372.45	7598.05		7611.12	7692.81	7774.50	25.00	385.11	7856.19
20500	9 50	372 69	7640 22		7648 43	7730 52	7812 61	25 00	385 11	7894 70
20600	9 80	372 93	7682 44		7685.74	7768 23	7850 72	25 00	385 11	7933 21
20700	10 10	373 17	7724 70			7805 94	7888 83	25 00	385 11	7971 73
20800	10 40	373 41	7767 02			7843 65	7926 94	25 00	385 11	8010 24
20900	10.70	373.65	7809.38			7881.36	7965.05	25.00	385.11	8048.75
21000	11 00	373 89	7851 79			7919 07	8003 16	25 00	385 11	8087 26
21100	11 30	374 14	7894 25			7956 78	8041 27	25 00	385 11	8125 77
21200	11 60	374 38	7936 76			7994 49	8079 38	25 00	385 11	8164 28
21300	11 90	374 62	7979 31			8032 20	8117 49	25 00	385 11	8202 79
21400	12.20	374.86	8021.92			8069.91	8155.60	25.00	385.11	8241.30
21500	12 50	375 10	8064 57			8107 62	8193 71	25 00	385 11	8279 81
21600	12 80	375 34	8107 27			8145 33	8231 82	25 00	385 11	8318 32
21700	13 10	375 58	8150 02			8183 04	8269 94	25 00	385 11	8356 83
21800	13 40	375 82	8192 81			8220 75	8308 05	25 00	385 11	8395 34
21900	13.70	376.06	8235.66			8258.46	8346.16	25.00	385.11	8433.85
22000	14 00	376 30	8278 55			8296 17	8384 27	25 00	385 11	8472 36
22100	14 30	376 54	8321 49	BEYOND		8333 88	8422 38	25 00	385 11	8510 88
22200	14 60	376 78	8364 47	LIMITS		8371 59	8460 49	25 00	385 11	8549 39
22300	14 90	377 02	8407 51			8409 30	8498 60	25 00	385 11	8587 90
22400	15.20	377.26	8450.59				8536.71	25.00	385.11	8626.41
22500	15 50	377 50	8493 73				8574 82	25 00	385 11	8664 92
22600	15 80	377 74	8536 91				8612 93	25 00	385 11	8703 43
22700	16 10	377 98	8580 13				8651 04	25 00	385 11	8741 94
22800	16 40	378 22	8623 41				8689 15	25 00	385 11	8780 45
22900	16.70	378.46	8666.73				8727.26	25.00	385.11	8818.96
23000	17 00	378 70	8710 11				8765 37	25 00	385 11	8857 47
23100	17 30	378 94	8753 53				8803.48	25 00	385.11	8895 98
23200	17 60	379 18	8797 00							
23300	17 90	379 42	8840 51							
23350	18.05	379.54	8862.29							

Figure 6-9.1

USABLE FUEL MOMENTS

WING AND FUSELAGE TANK

POUNDS/KG	GALLONS/LITERS KEROSENE 6.7 #/GAL.	MOMENT/1000 WING KEROSENE	MOMENT/1000 FUSELAGE KEROSENE
100/ 45	15/ 56	38.41	44.55
200/ 90	30/ 113	76.85	89.18
300/ 136	45/ 169	114.75	133.67
400/ 181	60/ 226	154.42	178.07
500/ 226	75/ 282	190.05	222.64
600/ 272	90/ 339	228.02	267.39
700/ 317	104/ 395	266.33	312.18
800/ 362	119/ 452	304.70	356.51
900/ 408	134/ 508	343.13	400.17
1000/ 453	149/ 565	381.71	443.06
1100/ 499	164/ 621	420.36	485.48
1200/ 544	179/ 678	459.03	527.86
1300/ 589	194/ 734	497.87	570.23
1400/ 635	209/ 791	536.81	612.62
1500/ 680	224/ 847	575.78	655.04
1600/ 725	239/ 904	614.83	697.46
1700/ 771	254/ 960	654.02	739.87
1800/ 816	269/ 1017	693.31	782.25
1900/ 861	284/ 1073	732.92	824.57
2000/ 907	299/ 1130	772.77	866.87
2100/ 952	313/ 1186	812.67	909.22
2200/ 997	328/ 1243	852.78	951.62
2300/ 1043	343/ 1299	893.07	994.09
2400/ 1088	358/ 1356	933.48	1036.56
2500/ 1134	373/ 1412	973.92	1079.03
2600/ 1179	388/ 1469	1014.40	1121.49
2700/ 1224	403/ 1525	1054.90	1163.96
2800/ 1270	418/ 1582	1095.37	1206.43
2898/ 1314	433/ 1637	1135.15	1248.00
2900/ 1315	433/ 1638	-	1248.85

POUNDS/KG	GALLONS/LITERS KEROSENE 6.7 #/GAL.	MOMENT/1000 WING KEROSENE	MOMENT/1000 FUSELAGE KEROSENE
3000/ 1360	448/ 1695	-	1291.20
3100/ 1406	463/ 1751	-	1333.43
3200/ 1451	478/ 1808	-	1375.68
3300/ 1496	493/ 1864	-	1418.05
3400/ 1542	507/ 1921	-	1460.45
3500/ 1587	522/ 1977	-	1502.93
3600/ 1633	537/ 2034	-	1545.30
3700/ 1678	552/ 2090	-	1587.66
3800/ 1723	567/ 2147	-	1630.07
3900/ 1769	582/ 2203	-	1672.56
4000/ 1814	597/ 2260	-	1715.00
4100/ 1859	612/ 2316	-	1757.29
4200/ 1905	627/ 2373	-	1799.51
4300/ 1950	642/ 2429	-	1841.70
4400/ 1995	657/ 2486	-	1883.90
4500/ 2041	672/ 2542	-	1925.98
4600/ 2086	687/ 2599	-	1967.94
4700/ 2131	701/ 2655	-	2009.80
4800/ 2177	716/ 2712	-	2051.89
4900/ 2222	731/ 2768	-	2093.69
5000/ 2268	746/ 2825	-	2135.36
5012/ 2273	748/ 2831	-	2140.42

Figure 6-10

WEIGHING INSTRUCTIONS

Occasional weighing may be required to keep the Basic Empty Weight current. All changes to the aircraft affecting weight and balance are the responsibility of the aircraft operator. For additional detail information relating to weighing and leveling procedures, refer to Maintenance Manual, Chapter 8.

1. The Basic Empty Weight C.G. is established with the wheels down.
2. Fuel should be drained through the drain valves prior to weighing and with the aircraft in level or static position. If unable to drain fuel, refer to the Unusable Fuel Table to determine weight and balance. Unusable and trapped fluids, (Figure 6-11), are included in the basic empty weight.
3. The engine oil must be at full level in each oil tank. Total engine oil is 34 pounds at Fuselage Station 467.1.
4. Hydraulic reservoir, accumulator, oxygen bottles, alcohol tank, and gear shock struts must be filled to normal operating capacities.
5. Determine aircraft configuration at time of weighing. Missing items or items in aircraft (but not part of Basic Empty Weight) should be noted and the final Basic Empty Weight shall be corrected for these items. All items should be in their normal place during weighing.
6. The aircraft must be in a level attitude at the time of weighing. Level is determined with a plumb bob attached to a clip on the upper side of one of the frames in the tailcone and the level plate hole on the lower portion of the frame.
7. Weighing should always be made in an enclosed area free of drafts. The scales used should be properly certified and calibrated.
8. Weighing the aircraft on jacks.
   a. Three jackpoints are provided for weighing: Two on the wing at Fuselage Station 414.83, and one on the forward fuselage at Fuselage Station 101.50.
   b. Leveling is accomplished by adjusting the jacks.
9. Weighing the aircraft on wheels.
   a. Inflate the tires to the proper pressure.
   b. Deflate the shock struts. This is to establish the fuselage station of the centerline of the nose wheel axle. The fuselage station for the nose wheel axle in this condition is 92.72.
   c. Leveling is accomplished by inflating the main gear struts.

d. Measure the perpendicular distance between the nose and main gear axle center lines. Add this measurement to the nose gear axle position (Fuselage Station 92.72) to obtain the main gear fuselage station.
e. Substitute the nose and main gear stations for the jackpoint stations on the Aircraft Weighing Record and proceed as in jackpoint weighing.

UNUSABLE AND TRAPPED FLUIDS

The basic empty weight includes full oil, trapped, sump, and unusable fuel. If the aircraft is weighed after draining the fuel and oil, the sump and unusable fuel and drainable oil must be added to the "as weighed" condition to obtain the basic empty weight.

When the aircraft is weighed with completely dry fuel and drained oil systems, the trapped, sump, and unusable fuel and drainable oil weight and moment must be added to the "as weighed" condition to obtain the basic empty weight of the aircraft. This dry fuel condition would occur only if the fuel system were purged.

UNUSABLE AND TRAPPED FUEL

ITEM	POUNDS	MOMENT/1000
	KEROSENE 6.7#/GAL.	KEROSENE
TRAPPED FUEL	12.1	4.44
DRAINABLE SUMP	11.9	4.61
INFLIGHT UNUSABLE	32.0	12.24
TOTAL	56.0	21.29

TRAPPED AND DRAINABLE ENGINE OIL

ITEM	GALLONS	WEIGHT (8.0#/GAL.)	MOMENT/1000
TRAPPED OIL	0.5	4.0	1.9
DRAINABLE OIL	3.7	30.0	14.0
TOTAL OIL	4.2	34.0	15.9

Figure 6-11

AIRCRAFT WEIGHING RECORD FORM

Date Weighed		Model 60		Serial No.	
Place Weighed			Weighing Inspector		
Reaction	Scale Reading	Tare	Net Weight	Arm	Moment
Left Jack					
Right Jack					
Sub Total				414.83 *	
Nose Jack				101.50 *	
Total (As Weighed)					
Total Items Table I			-		
Total Items Table II			+		
Basic Airplane					

TABLE I

Items weighed but not part of basic airplane	Weight	Arm	Moment
jack pads			
TOTAL			

TABLE II

Basic items not in when weighed	Weight	Arm	Moment
unusable fuel			
TOTAL			

* Jackpoint stations for electronic scales weighing.

Figure 6-12

LEARJET
MODEL 60

WEIGHT AND BALANCE
DATA PACKAGE

DATE _____

AIRCRAFT SERIAL NO. _____

BASIC EMPTY WEIGHT _____

C.G. _____

MOMENT _____

The data provided in this package reflects the configuration of the aircraft at the time of its initial delivery by the manufacturer. It is the responsibility of the aircraft owner and operator to update this data package when required by aircraft changes.

Included in this package are:

- ❑ Aircraft Weighing Record
- ❑ Payload Moments Chart
- ❑ C.G. Envelope diagraming the effects of various loading configurations (includes the supporting data)
- ❑ Aircraft Equipment List

LOG OF SUPPLEMENTS

Assigned to Aircraft Serial Number _____

This list is intended to assist the flight crew in determining the applicable AFM supplements for the assigned aircraft. Only those supplements which apply to the assigned aircraft need be listed here. It is the responsibility of the aircraft owner and operator to maintain this list. Insert this list behind the AFM SUPPLEMENTS & APPENDICES divider tab.

DATE	APPLICABLE SUPPLEMENTS	
	AFMS Number	Title

Continued

Log of Supplements

DATE	APPLICABLE SUPPLEMENTS	
	AFMS Number	Title